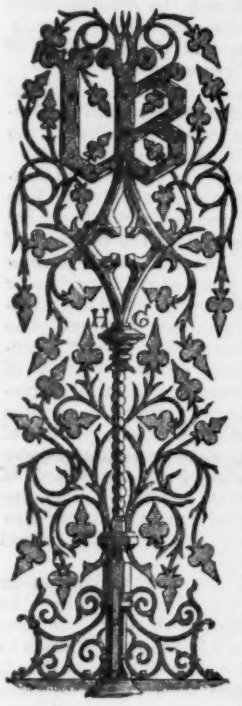
The Builder.

VOL. XXVII.—No. 1400.

Researches upon the Strength of Materials employed in Modern Systems of Building.



E are in receipt of the second and concluding volume of Mr. Bindon Stoney's work on strains in girders and similar structures.* The publication of the first part of this treatise some three years since, it may be remembered by some of our readers, received at the time a passing notice in our columns.

The work in its complete form appears likely to prove so important a contribution towards the elucidation of the science and practice of construction that we are inclined to consider that the present volume, from the elements of which it treats, puts forward claims to somewhat fuller notice.

Although so long an interval may be regarded by some to have elapsed before the appearance of the concluding portion of the work, when the wide range of authorities to which the author has had occasion to make reference is noted, and the nature of the inquiries incident to such a work is borne in mind, it will no doubt be admitted that time would be necessarily occupied in the production of such a volume as that which is now before us.

It appears at an opportune moment, as a want has long been asserting itself, no less on the part of the general public than in professional circles, with reference to the comparative safety and durability, as well as cost of modern engineering and architectural erections.

More particularly may this, perhaps, be said to be the case in regard to compound structures in which iron and other materials may have been extensively employed.

A theory has sprung up of late years which has been by many considered favourable to the application of iron to building purposes largely in conjunction with the ordinary practices of architecture. Since the introduction of this system, however, the theory of construction itself would appear to have become so widened by successive changes in the manufacture and preparation of building materials, more especially of lately added elements, that former investigations into the strength and properties of materials, have in some instances become more or less valueless and inapplicable. Unlike a somewhat similar treatise to that which is now under consideration, which was issued by Mr. Clark, and founded upon the construction of the Conway and Britannia tubular bridges, the conclusions which have been arrived at by the author of the present volumes are not alone based upon such features as might have been observable during the erection of any particular undertaking, but in addition embrace the opinions of many well-known authorities who have treated of some of the questions which are involved. The treatise upon the Anglesea and Carnarvon Bridges has long been regarded as an authority of rank, owing to the circumstance that many of the assertions which it embodies could be referred to actual experiments which were necessitated in carrying out the undertakings of which the work treats. The value of Mr. Stoney's work, independently considered, may be inferred, when it is remembered that in a single span of 460 ft. of the Tubular Girder Bridge, between Holyhead and Anglesea, no less a quantity than three thousand tons of material is employed, while in other structures which serve a like purpose the desired objects have been accomplished with less. Notably we would refer to the late Mr. Roebling's bridge over the Niagara Falls, in America, a structure which is, as well known, used for purposes of locomotive passenger and goods traffic, and yet comprises within a single span of 820 ft. only one thousand tons of materials, and of this quantity more than one half is timber. The scope which, by such a contrast alone, would seem to be afforded for a more economical adaptation of material than that which obtains in English practice, might be considered to justify the researches into which Mr. Stoney has been led in these volumes, and we would have been far from displeased to have observed a reference to the comparative cost, style, and weight of such undertakings as executed in England and elsewhere, notwithstanding the prejudicial reflections to which such an inquiry might be calculated to give rise.

The question of the weight of materials demanded in the erection of bridges was, we believe, first sought to be experimentally realised in this country by Mr. Peter Barlow, whose standard investigations upon the strength of materials are frequently referred to in the present volumes. Although, contrary to the predictions of the moment, considerable success has attended the erection of the Niagara Railway Suspension Bridge, the system upon which it is constructed would not appear to have largely recommended itself for adoption. Numerous costly railway bridges have recently been erected over the river Thames, and in some instances the question of level has, at great additional cost, been seen to have been subordinated to the requirements of an arched structure. A more extensive application of the Niagara Bridge system has been lately employed in the designs of a grand bridge over one of the American rivers, and we believe that it has long been an object, on the part of Mr. Peter Barlow, to introduce a somewhat similar class of suspension bridge into the domain of engineering science in this country. It is well known that the present Lambeth Bridge embodies a most important series of investigations as to the cost and stability of bridge accommodation, and that Mr. Barlow made a special journey to inspect the Niagara structure before this experiment was attempted. The longitudinal stiffening of the Lambeth Bridge is of iron, while in Mr. Roebling's design it is of wood. The question as to the desired rigidity in such structures mainly resolves itself into the dependence which may be placed upon the nature of the materials to be employed. Prior to the application of iron in the form of wire cables in suspension structures, it is well known that English engineers regarded with much diffidence the continuity of certain qualities in iron throughout great lengths, either in the form of girders, suspension links, or laminated bands. This doubt yet largely prevails, and some important evidence is adduced in reference to these points by Mr. Stoney, which is likely to engage considerable attention in the professions of engineering and architecture.

We are led to infer that the author is in accord in a certain measure with Mr. Barlow as to the magnitude of practicable spans upon the suspension principle, and that this object would be chiefly likely to be attained where the inherent defects attending the application of iron in ordinary forms may be avoided. So far, up to the present moment the economical appliance of iron in the erection of bridges of large span would appear to be discovered in cases where that material has been employed in the form of continuous twisted wire ropes. In view of the future erection of any large railway bridge, say for instance, over the Mersey, uniting Liverpool and Birkenhead, a project which has been long contemplated; or, in the event of the necessity arising for the maintenance of the connexion between Holyhead and Anglesea, should the existing means fail, the practicability of the suspension system as seen to be successfully carried out in America will necessarily claim further attention and research.

Mr. Stoney's references to the experiments of Mr. Kirkaldy, which are given in a valuable tabulated form in the body of the work, are in no way calculated to reassure us as to the advantages which would be likely to attend a too unguarded employment of iron and cognate materials in architecture. It has been demonstrated that regard must be paid to architectural requirements in cases where iron may be proposed to be employed as an auxiliary material, and many results tend to prove that in this respect the tentative science of engineering must be held subordinate to the better founded and established laws of architecture.

Mr. Stoney observes that when an imperfectly elastic material has received a permanent set from the application of any weight, which is subsequently removed, the material becomes more perfectly elastic than before within the range of strain which first produced the set, and its alteration of length per unit of strain is less than at first. For practical purposes the author asserts that the limits of elasticity in wrought-iron does not exceed twelve tons per square inch; and though higher strains than this may not in the least diminish its ultimate strength, yet they will take the stretch out of it, and this may render iron which was originally tough and ductile so hard and brittle as to be seriously injured for many purposes. It is, in our opinion, to the injudicious tests to which iron is occasionally subjected, that many cases of rupture may be attributed in that material, and possibly many instances of disastrous boiler explosion. The extreme facility with which the tensile strain and compressive resistance of iron may be regulated has almost rendered the employment of that material at length dangerous, especially in conjunction with materials of dissimilar properties.

Iron may be made to pass through so many grades of deterioration in its manufacture without readily indicating the processes to which it may have been subjected without actual strain or fracture, that the tendency of home and foreign competition, coupled with the facilities to which we have referred, has resulted in bringing the production of that article in England in some directions to a discreditable level. It would appear that the tensile properties of iron may be retained over a wider range of cheap contamination than some of its other properties, and many of the qualities of iron now usefully employed in building are imported from abroad.

We notice with interest that in connexion with the theory of strains in girders and similar structures the imperfections which are most commonly to be met with in the materials which are adverted to, are viewed with that importance

* The Theory of Strains in Girders and similar Structures; with Observations on the Application of Theory to Practice, and Tables of the Strength and other Properties of Materials. By Bindon B. Stoney, B.A., Member of the Institution of Civil Engineers, and Engineer to the Dublin Port and Docks Board. In Two Volumes, with Illustrations. London: Longmans, Green, & Co. 1869.

which this branch of the subject deserves. There could not, perhaps it may be said, be found in any publication extant a more masterly exposition of the general properties of iron than is to be met with in this volume. No review of a work of this kind could probably do full justice to its contents, for, being mainly intended for the instruction of engineering students, and for guidance in the varied elements of constructive science, it would be attended with difficulty to single out for especial remark any particular branch of which it treats. We do not remember, however, in any similar work which has come under our notice to have observed the question of connexions in iron so treated of as in some portions of the later volume, more particularly under the heading of appliances for connecting ironwork, pages 351 to 370. A perusal of the first 265 pages of vol. ii. would well repay the attention of architects and builders, being composed more particularly of a treatise on compressive resistances in bodies of brickwork, stone, iron, and various classes of cements, as well as including the action of cements and builders' materials under tensile and lateral strains. This feature of the work, in view of the recent incident at the Holborn Valley Viaduct, is entitled to especial attention.

Quoting some experiments of Mr. Clark, in relation to the action of stone under compression, the author says that in the instance which he refers to, "the sandstones gave way very suddenly, and without any previous cracking or warning. After fracture, the upper portion generally retained the form of an inverted square pyramid, very symmetrical, the sides bulging away in pieces all round. The limestones formed perpendicular cracks and splinters a considerable time before they crushed."

It will be borne in mind by many that this description represents nearly the order in which the fractures in the Farringdon-street columns would seem to have been generated. We hope, however, these are not so extensive in the mass as might be inferred from the external appearance of the columns. Continuing from this portion of the work, Mr. Rennie observes, "it is a curious fact, in the rupture of amorphous stones, that pyramids are formed, having for their base the upper side of the cube next the lever, the action of which displaces the sides of the cubes precisely as if a wedge had operated between."

The features which have presented themselves in the visible lines of fracture upon the polished facets of the Holborn Viaduct columns, appear so to approximate to what might have been anticipated from the experiments which are described in this portion of Mr. Stoney's work on the theory of strains, that we view the occurrence with a regret which no assurance with which we have yet been inspired has diminished to the extent that could be wished.

The importance of such a treatise as that which Mr. Stoney has at length produced in the hands of the pupils of modern engineering and architectural establishments cannot well be overrated.

In concluding the observations which we have been led to make upon the perusal of the work, we would note the singular lucidity of the arrangement of the lettter-press and the novelty of the illustrations which is displayed. As an example of the clearness and simplicity for immediate reference with which works of a similar character may be contrived, it may claim to possess several features well worthy of imitation.

In the absence of that special education which is supplied in engineering schools and colleges on the Continent, many of our apprenticed students are left to acquire the elements of their profession at hap-hazard. It is impracticable that any engineer or architect of reputation could advance by personal instruction the number of pupils which may be found in the leading offices, and the progress of younger members of the profession is consequently narrowed, and mainly dependent upon such faculties of observation and imitation that they may chance to possess.

Mr. Stoney's work lends a ready key to the more abstruse elements and problems of constructive science; and it is sufficient to bear in mind the length of time over which the author's labours have extended in its production to reach the conclusion that the work may have been written with other objects than those of pecuniary gain or contemporary praise.

It cannot fail to be regarded as a valuable accession to the literature of applied arts and sciences, and in its more especial direction should take a foremost rank.

THE LIGHTHOUSES OF THE BRITISH ISLES.

The Trinity Board.

Scattered notices have appeared from time to time, in the periodicals of the day, of some interesting particulars as to engineering and other works in connexion with our lighthouse system; but the topic is so peculiarly attractive to the "gentlemen of England who sit at home at ease," that we propose to lay before our readers a general sketch of the whole arrangements for the illumination, if we may so call it, of our British coasts.

The genius of the nation is prominently distinguished for its voluntary enterprise, as distinct from Government control: witness the Lifeboat Institution; up to the present time a private society supported by the liberality of the public. The lifeboat is the last hope of the wrecked sailor, when the winds and waves are doing their worst; and surely one of the sublimest forms of charity is that which saves our mariners from the last danger of the vasty deep.

With this, however, at the moment, we have not to do; our subject is what may be called the previous question. The lights that show the dangers of our rock-bound coasts are the most important agents in carrying out the wish that used to be expressed in homely terms upon our bills of lading, *and so God send the good ship to her port in safety.*

Who builds our lighthouses, and how are they maintained? Whence come the requisite funds? What is the construction of the lighthouses? and what are the lights themselves? are questions in which we, as the first maritime nation in the world, should, and do, feel the deepest interest.

Pharology, the modern term for the science of lighthouse building and lighting, remained, up to the commencement of the present century, nearly in the same state as it had been left by the Romans a thousand years ago; but since then it has made rapid strides. The celebrated Cordonan tower in the Bay of Biscay, completed in 1611, may be called the first of modern lighthouses, as indeed modified by successive improvements it probably still remains.

The Eddystone, off Plymouth, familiar to us by Smeaton's celebrated work, was perhaps the next of note. It was completed in 1759.

The next great rock lighthouse of modern times was the Bell Rock, on the east coast of Scotland, built by Robert Stevenson in 1810, from which date improvement and development have been rapid and various, both in the erection of the towers and the method of lighting.

And first, as to the question of who builds our lighthouses, we answer, the Trinity Board of Deptford Strand; and a few words as to their constitution and functions may not be out of place. They are a chartered corporation, dating back from Mediæval times, their various charters, of which we have record, having been granted successively by Henry VII., Henry VIII., Edward VI., Elizabeth, James I., and Charles II., and under these charters their powers were exercised, and their sphere of action developed, until, by the Mercantile Marine Act of 1854, a certain jurisdiction was given to the Board of Trade, and some important alterations took place in the financial arrangements.

The powers of the Board extend to buoys, beacons, and sea-marks, as well as lighthouses, though probably the last exceeds all their other functions in interest and importance. Charters, from Magna Charta downwards, have been granted by the Crown for various objects of public weight or private interest as long ago as any record has been kept in any archives; but probably this is the sole instance of a private chartered corporation, for that was its original character, still at the present moment discharging, and that efficiently, though subjected to the most searching investigation, the very duties for which it was originally constituted in the dark ages of our history.

One of the records of the early renewals of the charter, date of Charles I., contains a characteristic comment as to what may be called the popular element in its earlier constitution, in the following remark from the well-known pen of Pepys, of the "Diary," the first master of the corporation,—"That the number of younger brethren could not be too great, that mariners are the strength of the nation, that every one has a right to be a brother, and that if there were 4,000, it would be more for the king's service than 400."

Our City companies, chartered as they are, have now entirely lapsed from their original vocations, and remain still noble institutions but confined in their daily work to social, charitable, and, in a minor and indirect way, political objects.

The greatest, probably, of chartered companies, the old East India Company, has only lately, as we may say, been absorbed into the Government of the country; but the Trinity Board, earlier in its institution than most of these, has survived them all, and is still doing its legitimate work, and doing it well.

In its present form the Board is self-elective, and pre-eminently nautical in its character. The younger brethren correspond to the livery of an ordinary company, and the elder brethren represent the court, consisting almost entirely of captains who have had the command of vessels for a number of years.

It will be readily seen what a vast mass of actual practical knowledge of the special requirements for lighting our coasts must be at the command of a body of men thus constituted.

The whole of the executive business is transacted by the elder brethren, subdivided into various committees, though certain special matters must be submitted to the approval of the whole body, *e.g.*, the erection of a new lighthouse. Some few years ago, this particular point was made a subject of popular investigation, or, we might almost say, suffrage. The inhabitants of the district were carefully canvassed, and it was only on presentation of petitions, signed by what was deemed a competent and sufficient majority, that the erection of a lighthouse, and, of course, the imposition of the consequent dues, was determined upon. The predominant authority of the Board of Trade, however, has much modified this course during the last few years, and the matter now rests much more entirely with the central authority.

The Trinity Board are the authorities in England, subject to the Board of Trade. In Scotland, there is a separate Board, "The Commissioners of Northern Lighthouses," always to a certain extent in union with the Trinity Board, though not incorporated with it. The same duties are discharged in Ireland by the "Commissioners for Irish Lights."

Local and harbour lights are also under the particular superintendence of the authorities of the port or harbour where they are situated, under the general superintendence of the Trinity Board, and these different authorities throughout the United Kingdom exceed 150 in number.

As in the case of most original charters, a sort of monopoly was the foundation of the grant, *i.e.*, a right granted by the crown to erect lighthouses, with power to charge upon the vessels using those lights a regulated toll. For many years this right was conceded to private individuals, as well as to the corporation; and there were many private lighthouses, each with its special radius and particular dues, thus erected,—much of the nature of a toll levied upon a road for improvement or otherwise.

In 1836, however, an Act of Parliament was passed, in view of concentrating and consolidating our lighthouse system, which gave the Board the power of buying up these lights for a compensation awarded by juries, in the way with which our late railway experience has made us familiar; and the sum thus expended by the Trinity Board was considerably over one million sterling. For the Smalls Lighthouse, at the entrance of the Bristol Channel, of which we shall give a further description, was paid the sum of 170,486*l.* 7*s.*, and for the Skerries, 444,984*l.* 11*s.* 3*d.*

So time ran on; the lights originally granted, and subsequently purchased, were maintained by the Board, and the dues collected by tolls in the earlier portion of the period, and more lately by a carefully compiled and minutely subdivided table of tonnage, until in 1853—the last year under the old system—the outgoings of all descriptions, buildings, lights, repairs, maintenance, &c., were, in round numbers, 136,000*l.*, and the income, 423,000*l.*; the enormous balance being expended partly in liquidation of the debt incurred in purchasing the lights, and partly in charitable purposes.

It was felt, when the general arrangements were revised, that the maritime community were being unfairly taxed for the benefit of the general public; and the result is, that the tonnage dues alluded to above have, within a period well within the memory of the present executive, been reduced by 50 per cent.; the object being to render the corporation self-supporting, without surplus or deficiency.

The Board has a good character. The Master (the Duke of Edinburgh) receives nothing, and the fees of the elder brethren are little more than nominal, when their duties and responsibilities are fairly regarded.

The Lighthouses.

The total number of lighthouses in Great Britain and Ireland exceeds 400; of these, something less in number than one-half are under the direct control of the Trinity Board, the remainder being under the same general superintendence, but managed by district local authorities, under different Acts of Parliament. All the more important stations and great rock lighthouses are included in the former section; while they vary in dimensions from a simple column bearing a gas-lamp, to the famous erection of the Skerryvore, a granite tower 158 ft. in height.

The cost of three of these is as under:—

	Cost.	Height.
The Bishop Rock Lighthouse, near the Land's-end	36,000*l.*	145 ft.
The Bell Rock	61,000*l.*	117 ft.
The Skerryvore, on the west coast of Scotland	83,000*l.*	158 ft.

When a lighthouse has to be erected on an ordinary foundation, the common principles of building, of course, apply,—the weights to be carried, the height of the structure, and the accommodation to be provided, are mere matters of ordinary professional calculation. But the peculiar difficulty of constructing many of our lighthouses is derived from the fact that they are erected under circumstances of the most exceptional danger, and that the most powerful resources of engineering science have to be brought to bear to cope with unusual characteristics, either of the forces to which they are exposed or the character of the foundations upon which they are to be erected. And first, as to the forces to which they are exposed, taking the Great Rock Lighthouses as our example, the vanguards, as we may call them, of our shores, which have been gradually pushed further and further from land in the face of the enemy, the sea. The force of the impact possessed by the waves of the sea in stormy weather is something terrific.

Mr. Thomas Stevenson constructed a self-registering instrument, which recorded the power of the waves that struck it, with the following result:—The average pressure at Skerryvore, for five of the summer months of 1843-4, was 611 lb. per square foot. The highest pressure registered during the height of winter storm was 6,083 lb. per square foot, and to this extreme power the lighthouse in question opposed a successful resistance. It may probably be regarded as the maximum pressure of the sweep of an Atlantic wave. In less exposed situations the pressure is much diminished. At the Bell Rock, in the North Sea, the highest registered pressure was 3,013 lb. per square foot.

The most exposed lighthouse in the world is probably the Bishop Rock. On the 30th January, 1860, the following incident occurred. We may say that there is a bell provided as a fog signal, which is hung more than 100 ft. above the sea-level. It weighed 3 cwt., and was hung with unusually strong iron fitments and gudgeons. On the date above named a storm wave actually wrenched the bell from its fixing; it was dashed to pieces on the rock, and a fragment was found some days afterwards firmly imbedded by the force of the storm in a crevice of the rocks.

Such are the forces that have to be overcome. We shall now proceed to give some further detail of the erections which are found efficient in resisting these influences from year to year, and their cost.

The ordinary land-towers throughout the United Kingdom generally approach 100 ft. in height, and cost from 10,000*l.* to 11,000*l.*; but there are many much less in size. The cost may be taken at an average of 8,000*l.*

There are forty-seven light-vessels under the control of the Board; their average cost, with the moorings complete, may be taken at 7,000*l.*; but their maintenance is very expensive, owing to the crew required. It may be taken at 1,100*l.* per annum, or about four times that of a first-class fixed light. And here we may notice the introduction of pile lighthouses on shifting sands as substitutes for floating lights.

Proverbially the worst foundation for an erection is the sand. "The house that was built upon the sand" is the type of all unstable erections. How much more when that sand is a quicksand in a waterway covered at high water, and shifting with the currents.

The pile lighthouses have to be erected under these difficult conditions, and we shall proceed to give a detail of one or more of the successful ones, as there have been instances in which they have had to be taken down, owing to the shifting or failure of the foundations. The first was erected upon the Maplin sand, off the Essex coast, from the design of Messrs. Walker & Burgess.

It is a curious fact that sand-banks, although so treacherous at their surface under the peculiar action of the water that they will gradually absorb and bury whatever solid matter is left exposed to the action of the tide, yet when the immediate surface is passed through they afford a sufficiently solid foundation for the erection of heavy structures upon piles. Indeed, of such a stubborn and solid nature is the interior of the bank that it is impossible to penetrate it with an iron bar, although driven by a pile-engine beyond a certain depth; and it is in reliance upon this peculiarity that pile lighthouses are constructed.

The Maplin Lighthouse is erected upon nine piles of wrought iron, 5 in. in diameter, furnished with screws at the bottom 3 ft. across (ordinary screw piles) driven, or rather screwed, down into the sand; and this is the only foundation.

From these piles spring strong cross-braced timbers in cast-iron sockets, starting from about 2 ft. above high-water mark. The total height of the building is 36 ft. above the same level; and the upper portion consists of an octagon room 6 ft. high and 27 ft. in diameter, entirely framed in wood, tied together with iron, and encased with wood boarding: the lantern rises high above it in the centre.

The room is divided into two sleeping-berths, a dwelling-room, and store-room; and below the floor, in the angular space left by the intersection of the cross braces, are coal-cellars, water-tanks, and other necessary conveniences.

The cost of the whole was about 5,000*l.*; and we may here notice a peculiar instance of the action of the sea on quicksands.

When the lighthouse was built, a strong timber-framed raft was first laid upon the surface of the sand, upon which the men worked, and through openings in which the piles were driven. When the work was done, it was suggested that the raft should be left as it was, with the object of acting as a tie, and strengthening the foundation, but a curious result followed: the scour of the water lifting and dropping the raft with every wave, had precisely the same effect upon the raft as it has upon a vessel, and it gradually began to work its way down into the sand, slipping over the piles, but with this difference, however, that, being held fast in its place by the piles, the sand would not cover it, but was washed away from its upper surface. It thus gradually sank for some years, lower on the one side than on the other, until there was an open pit in the sand several feet deep, and the whole size of the foundation, raising grave apprehensions as to the security of the building.

Many hundreds of heavy faggots, with tons of chalk attached, were put in in the hope of filling the opening, but the next storm invariably swept them away.

This went on for some years, until one season the pit was so deep that a sufficient accumulation of sand gathered on the upper surface of the raft, to prevent its being again moved by the water. Once at rest, the same agent that had occasioned the damage repaired it: the wash of water filled up the pit with sand, and the top is now a level surface with the rest of the bank. The house was erected in 1840.

We must reserve the remainder of our statement for another number.

ON SOME OF THE DIFFERENCES OF STYLE IN OLD BUILDINGS.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the ordinary meeting of the Institute held on Monday evening last, Sir W. Tite, M.P., president, in the chair, Mr. G. E. Street, A.R.A., read a paper "On some of the Differences of Style in Old Buildings."* Mr. Street commenced by remarking that he should confine himself on this occasion to bringing before his audience some considerations as to the causes which produced the differences of style observable in Mediæval buildings throughout Europe. It was, he said, the especial glory of our national architecture that its developments are so many, so various, and so true that no one who has both zeal and brains can avoid having his enthusiasm awakened in the course of his study. The differences in style in old buildings are very great, and the result of various causes. The work of old architects owed not a little of its vigour to its variety. Each man who had any inspiration did the best he wot of, and of course produced his school of followers, and the fact that so many men did this showed how infinite is the life and variety of which Gothic architecture is susceptible, always in strict obedience to the true principles upon which it was founded. Among the causes of variety the following were mentioned:—

1st. The requirements of materials, which are obviously different in districts which allowed of the use of only stone, or brick, or timber.

2nd. The influence exercised in certain districts by exceptionally gifted architects.

3rd. The spread of art-knowledge by orders of men such as Freemasons, and religious orders whose habits gave them knowledge of countries other than those in which they were for the time working, and in the course of conquest or colonisation of one country by another; and, lastly, the employment (not at all uncommon in the Middle Ages) of foreign architects.

4th. Attempts in one age to copy work done in a previous age.

The requirements of the most available material certainly played no small part in the history of architectural development. We must remember that of old an architect was almost compelled to use the material nearest to his hand; water conveyance being the only chance he had of importing the material of one district into another, and of this ample use was made, but, of course, the opportunities were rare: but in thus working in the material nearest to hand, the architect dignified his art by proving that no material which God had provided was unworthy of it. Thus it was, in the Middle Ages, a good stone country produced good masons. The country about thus became proud of their work, and gave them plenty to do; and so from age to age they produced a succession of buildings, all worthy of our admiration. It was difficult to build badly with plenty of good stone to build with. The dignity of the material was a safeguard against utter badness of workmanship, and so the best art in England and elsewhere is found nearest to the best stone quarries. Wherever stone could not be procured in the neighbourhood, there the artists did their best at once to make the most of the other materials which were available. Throughout Europe, the early architecture was the work of stonemasons, and the carpenter and bricklayer were but little esteemed; but when in the Middle Ages other materials had to be used, there arose the first opening for a difference of style, caused by a change of material. Take the case of a granite country. Go to Guernsey, where granite was plentiful, and where there was no timber to be had, and we find buildings expressly contrived to meet this state of things; and this was especially noticeable in the churches. With all their rudeness of construction in an intractable material, these Guernsey churches are full of interest and character. Having cited other examples of this kind of construction, in this country and on the Continent, where it would seem the attempt was made to construct buildings which should be as imperishable as the materials of which they were built would allow, Mr. Street passed on to the use of flint in various parts of the kingdom, by which the style of design was also affected. In flint districts, stone was scarce, and builders who had to import their stone from the quarries at Caen, or from some far-off part of their own country, were obviously likely to be very economical in its use, and hence those buildings were erected with as few quoins as possible.

Those whom he addressed were all aware how much the use of brick had affected the art of design wherein it had been adopted. The great fields of brick architecture were the north of Italy, the north-east of Germany, the west of France, and various parts of Spain. The development of each was different, but they all agreed in the discovery of certain properties in bricks; but they, it seemed, all agreed, that if brickwork is to be strong, it must be built with an enormous quantity of mortar; and so, instead of specifying, as enlightened nineteenth-century architects do, that "no mortar joint is to be more

* The following gentlemen were elected Associates, viz., D. Robert Dale, Angel-court, E.C.; Thomas Hill, 14, Bedford-row, W.C.; Robert Lamb, Darlington; William Smith, 1, Moorgate-street; Alex. R. Stenning, 157, Fenchurch-street; and Frederick Strauts, Christchurch, New Zealand.

than ¼ in. thick," he thought, if we could find a Mediæval specification, we should find it ran in this form,—"No mortar joint to be less than ¼ in. thick." Then it came to be found that bricks might be moulded, and that if the earth were well tempered and fine, any delicate pattern might be reproduced in a hard material, which would almost defy weather. The result of this was that in most brick districts we see moulded brick traceries used and repeated all over a building, not because they were very beautiful, or because they were required, but because they existed, and had to be used. Examples of these repetitions of tracery were found all over the transepts of St. Katharine, at Brandenberg; while it was a curious fact that in Italy, France, and in Germany the use of brick led to the erection of sham fronts in front of the roof gables, the main or only use of which was to show off the variety of moulded bricks. A close affinity in cause and principle would be seen between such fronts as those of the town-hall at Lubeck, the gables of the churches in and near Toulouse, and the transepts of Cremona Cathedral, whilst each was entirely independent of the other in style; and evidently their architects knew nothing of each other's work. Having referred to the curious effect of this brickwork upon stonework in the same districts, which was particularly noticeable in the buildings of Venice, the author proceeded to comment upon the change which was effected in architectural design where wood only was available for building. In the districts of Hampshire, Worcestershire, Montgomeryshire, Cheshire, and Lancashire oak timber was wonderfully plentiful in the middle ages; but in all parts of the country wooden buildings were very common, and at the present day there are a vastly larger number of Mediæval domestic buildings of this material than of stone. It was worthy of notice that where oak was very plentiful, it led to important developments of design, as was instanced in the magnificent roofs of Worcestershire and Montgomeryshire, where timber of enormous scantling was available, as compared with those of Sussex and Kent, where the timber seems to have been much smaller.

On the next head of the subject, viz., "The Influence exercised in certain Districts by exceptionally gifted Architects," the author remarked that of course in the Middle Ages, just as now, there was great difference of style, and great diversity of power, in the works of various architects. As a rule, each man's work will be found in one district. Sometimes it is the cathedral which sets an example to the diocese; sometimes it is the hand of an architect brought specially for the work from a distance; but a careful examination of various works will show such evidence of unity of design and similarity of system as would enable us to classify them with the same sort of ease as we are at this day able to detect the hand of all our better architects in their various works. In support of this position the author mentioned the instance of Westminster Abbey and a small parish church at Stone, near Dartford, as affording evidence in some of the details of the architecture that the architect was the same in both structures. The same observation applied to the churches of Merstham, Chipstead, Cliffe-at-Hoo, Brasted, and Merton. Another curious case is that of Bristol Cathedral and Yatton Church. The lecturer pointed out the evidences of similar origin in the cases he mentioned, to which many others in various parts of the country were added.

Having dwelt on these points at considerable length, the lecturer passed on to remark that there remained only one other head on which he would detain the meeting, and that was the influence on style which is caused by attempts to copy in one age what had been done in some previous time. The old Rhenish architects of the thirteenth century must have purposely shut their eyes to what was going on in the Domaine Royale in the first half of that century, and would not, without a struggle, give up the main features of their churches. So in such a church as that noble one at Münster Maifeld, they deliberately relieved many of the characteristics of a Romanesque church along with parts and details which showed an acquaintance with thirteenth-century Gothic. In somewhat the same way architects in Spain were building completely Romanesque churches at the very same time that, at Leon, Burgos, and Toledo, French architects, brought there for the purpose, were building magnificent churches under their very eyes of the purest and most advanced Gothic.

Then there were many cases in which we find an architect of one period trying to conform his work to that of an earlier building to which he has to add. An instance of this, he said, was to be found at St. Eluć, on the Mediterranean, near Perpignan, where there existed a cloister which at first sight one would suppose to be purely Romanesque; but, upon inspection, it was quite clear that whilst the west and south sides are of the twelfth century, the east and north aisles are of thirteenth or early fourteenth century work, copied in general outline and design from the earlier work, though natural foliage is freely introduced in place of conventional. They all knew the case of Westminster Abbey, where, with what appeared to be excellent judgment, the noble design of the earlier church was continued in the fifteenth century with so much general similarity that uneducated eyes would not detect the difference. Worcester Cathedral affords another case of the same kind, for there evidently the architect of the nave tried to make his work harmonise entirely in its lines and general design with the thirteenth-century work of the choir. The results, both at Westminster and Worcester, were not encouraging; but both designs being really full of life, and fire, and poetry, the eye feels no pain at the extraordinary discrepancies of detail where all is beautiful. But there is, perhaps, in England no example of copying so well worth study as that of the grand old Devonshire church of Ottery St. Mary, which, though evidently built late in the fourteenth century, in imitation of the neighbouring cathedral of Exeter, was, nevertheless, designed with a clear intention to hark back to still earlier examples, and to imitate many of the features of the thirteenth century. The work is so well imitated as to give the impression, until their detail is examined, that it is really the work of the thirteenth century. Their detail, however, is so pronounced as to leave no doubt whatever as to the age of the work; and this led to the observation that had often been made before, that our forefathers never knew how to copy what they saw. Some men would tell us that because they knew not how to copy what they saw, we ought not to do so either; and that every one, giving reins to his imagination, should design just what liketh him best, without reference to antiquity or precedent; in a word, that we should all take courage by the example of that wonderful Strand Music-hall. He ventured to dispute any such suggestion most energetically. We saw enough of other men's works, and knew enough of other men's studies, to know that the most original and most admirable work is that of the men who studied old buildings the most thoroughly; and he was amused to see every now and then attacks made upon their originality and honesty as architects by men who told them their works were mere compilations, whilst if they saw any of the designs of those very men in what they were pleased to call the Gothic style, they would find that they were indeed simple leaves taken out of the vulgarest book of specimens, without the slightest power even of copying accurately the work before their eyes, and still less of assimilating or fusing together with any kind of harmony the various pages from which they got their designs. The more they studied old art the less they would want to copy it; and the only way to escape from the necessity of simply copying was to devote themselves with enthusiasm to its accurate study.

At the close of the paper, a conversation took place on subjects mooted in it, in which Mr. Seddon, Sir Digby Wyatt, Mr. C. Fowler, Mr. C. F. Hayward, and Mr. I'Anson took part.

THE SOCIETY OF PAINTERS IN WATER COLOURS: WINTER EXHIBITION.

Last Saturday, the sketches and studies contributed by the several members of the Old Society of Painters in Water Colours were privately viewed, as is customary, before the public were invited to see the display. The present exhibition is the eighth and the least interesting of the series; for, any difference that may be observable to distinguish it at all, is of a somewhat unfavourable nature. Too constant a complacent reiteration of claims to be considered, even superlatively clever, becomes fatiguing at last, let them be ever so undeniable. The weather was bad; just such as must have persuaded the poorest of us, that an omnibus was one of the cheapest and dearest of blessings, for it rained with cool, dogged determination to rain as disagreeably as possible, and as if to wash out all recollection of finer days. At such a season the ideas to be associated with those more delightful natural aspects likely to be selected for an artist's sketch or study are very welcome; and it is disappointing to find so often a revised edition, in lieu of a direct transcript, that conveys more of the reality than he who instinctively apprehended it at the time can ever afterwards imitate.

However, there are many very beautiful drawings, none more so than Mr. E. Duncan's (182) "Waterfall on the River Broom, Rosshire," that in spite of its exquisite workmanship bears every appearance of having been "done on the spot," like the two studies of "Whitby Scaurr," by Mr. G. Dodgson (190, 198), for it would appear to be difficult indeed to represent such truth from memory. The figure subjects are either fewer than usual, even compared with the landscapes, or much less attractive. There are no chalk drawings, by Mr. F. W. Burton, whose absence is much felt in viewing the collection. Mr. F. Tayler is not so conspicuous as on some former occasions, though his heroine on horseback, petting her dogs, "Favourites": a Study for a Hawking Picture" (170), shows more symptoms of falling off than he himself does; the horse leans dangerously forward of the centre of gravity, as sometimes horses do: neither is Mr. Carl Haag, though his contributions are numerous and he is still one of the most important contributors. "The Sheikh" (177) is an admirable study of a head, brilliantly painted and lifelike; and "The Temple of Jupiter at Athens" (131), with the Acropolis in the distance, is scarcely less emphatic for colour, perspective, and effect than "The Interior of the Odeon of Herodis Atticus at Athens" (103). Mr. John Gilbert is best to be identified with two of his smaller emanations, "William III. in Battle" (391), and another capital composition of martial men and horses doing duty as "Outpost" (398) that exhibit most forcibly his great command over colour and effect. Unlike these, Mr. Walker's drawing of "A Lady in a Garden, Perthshire" (336), derives its great value from subdued colouring and a breadth of effect that never interferes with an appearance of elaborate finish, but gives a charming completeness to it; this constitutes its worth, for the lady is a perfect lady and no story-teller. Mr. G. J. Pinwell evidently has great admiration for the qualities that distinguish Mr. Walker's interpretations of natural appearances, but he will lose himself with his outlines if he follows him blindfold; similar amenity of colour belongs to the description of "The Last Load" (356), but making every allowance for the diffused and confusing twilight of a warm summer evening, the many figures melting into flatness with the background are more suggestive of a fading tinted photograph than of probable reality; and these many figures are rather vapid representatives of a happy peasantry, and seem to share depression by common consent. The screens usually supply the index to what the voluminous works may promise; they are rather empty on this occasion.

Mr. A. D. Fripp loves sunshine evidently, for his fisher-folks are indicative of this. The "Finished Study for a larger Work" (14) is very carefully and cleverly done. His study of Venetian buildings (91) revives old notions, for they are very gem-like in colour, as well as conscientiously drawn.

Mr. T. R. Lamont has two very pretty drawings finished with close reference to Nature: one of a delicate child talking to a gardener who has been mowing like old Time, and cutting down the daisies with the rank grass; "There are no Birds in last Year's Nest" (74), may be a premonition. "Green Corn and Poppies" (82) afford a more lively theme for conjecture. "Sacharissa" (95), and "A Youth carving a Name on a Cherry-tree" (303), by Mr. E. K. Johnson, advance us yet another stage in finish—more ways than one; and "The Brook" (149) was chosen by the Poet Laureate for an illustration, as well as by Mr. J. D. Watson, who is mistaking blackness for power. A Puritan maiden "At Prayer" (202), and, with the same objection, a "Northumbrian Fisher Girl" (275), are the best of the ten items exhibited by him, excepting "A Study" (161) for a portrait, which should be the very first and best. Mr. F. W. Topham's "Flower Stall, Venice" (194), is delightful for colour. It is to be wished he had more liberally assisted the collection; for the landscapes predominate to such an extent as to leave figure representation for small consideration.

"Prudhoe Castle, from the Moat, Northumberland" (10) by Mr. T. M. Richardson; "The Vale of Nant Gwynant" (62), by Mr. T. Danby; "The Rocky Valley, near Tintagel" (87), by Mr. S. P. Jackson, who has overcome his tendency to dingy neutral colours and cold greens, as "The Weir Pool" (92), will leave just a dim recollection of; "Going on the Thames" (138), by Mr. J. J. Jenkins, and "Skirting Knole Park" (148), as good as any of the nine that repeat the same name; "On the Hills, Loch Hourn" (144), by Mr. Francis Powell; "Pangbourne" (174), by Mr. Birket Foster; "A Rough Sea" (187), by Mr. C. Davidson; "An Autumnal Evening" (242); and "Loch Cornishk" (368), by Mr. Alfred W. Hunt,—whose works all betoken a keen observation and an admirably honest method of recording it,—are but a few of the better works exhibited.

Mr. H. B. Willis has depictions of calves and cows that appear ignorant of all cattle diseases, so nice and clean and well combed are they.

We wish we could say more of the drawings, the works of the leading professors of water-colour painting; for with the shoals of such productions as are now in the flood of a mercantile prosperity it would be well to have some thought for the future and the medium. It may surely be prognosticated that such an issue of a manifold form of its minor application will lesson the value of its more important use, and all water-colour drawings be hereafter designated sketches and studies, with so little to distinguish them from finished performances as at present exists.

MISSION HOUSE, SEACOMBE.

WE have already published particulars of the Mission House at Seacombe, a village on the Mersey, opposite Liverpool.* With this we give a small view of the building. The people belong chiefly to the poorer and more neglected classes. "The state of education is very defective; home-training is bad; drunkenness is common; a low moral tone prevails." For some years the Egremont congregation have been engaged in mission work in the village. An old Wesleyan chapel was first acquired on lease, and fitted up for the use of the mission; and, about a year after, an adjoining building was also taken, to meet the growing requirements of the work. But all the available accommodation in these buildings became too strait for the operations of the mission. It was therefore resolved to erect new premises, with suitable mission-house and class-rooms; and on the 20th of July last the new building was opened. The cost of the building, including the site, has been about 2,300*l.*; of which sum a balance of 750*l.* remains to be collected.

The first gathering in the old mission-house was the Sunday School, which still continues to prosper, and now numbers about 30 teachers and more than 300 scholars.

Among other agencies, a day-school was commenced in 1863. In the new rooms, and in the hands of the three teachers at present on the staff of mission workers, it is confidently hoped that this school will prove a great success. Working lads beginning to earn wages have also been cared for; and an endeavour has been made to fill up their evenings by the attractions of instrumental music, and the more profitable employments of the night-school and Bible classes. Beginning with one, there are now fifty workers, and not less than 800 persons are under direct and constant influence. The builders were Messrs. J. & T. Mason. Mr. H. H. Vale was the architect.

* See p. 842, *ante*.

MISSION-HOUSE AT SEACOMBE.

LECTURES ON ARCHITECTURE AT THE LONDON INSTITUTION.

IN the second lecture of the course, Professor Kerr took up the subject of classical architecture. Starting at the point B.C. 500, he considered the position of Persia, which had overthrown the venerable empire of Egypt, and was now jealous of the rising importance of Greece, a new nationality founded, not on conquest or tradition, but on commerce, enterprise, and unprecedented intelligence, and destined before long to initiate a new civilisation. Accordingly, remembering the principle that architecture is history in stone, it would be certain that a novel system of the art was about to arise. Then tracing the order of origin of the arts, sculpture first, then poetry, then architecture, and a long way in the rear painting and music, and touching again upon the question of religious influence as a prime mover in all, and most notably in architecture, he rested at length upon the examination of the Doric Temple and the Parthenon. Explaining the theory of the timber-work type, he passed on to critical observations upon the new architectural features now established, such as the advanced design of the column, and of the entablature, the portico, the peristyle, the stylobate, the cornice of utility, the pediment the exquisite use of sculpture, the more defined arithmetical proportions (repudiating, for his own part, all geometrical theories, the conic-section mouldings, and the fastidious optical corrections); remarking also upon the effect of precision of workmanship, which, however refined and extreme, was always to the advantage of classical design, whereas in Gothic the effect of masterly and sometimes rude work was as essentially a vital element of success. The Ionic and the Corinthian columns being next considered, the lecturer pointed to the fact, almost more remarkable than all, that a complete system of columnar design, in three distinct and artistically perfect "orders," had now been accomplished; besides which an equally complete system of mouldings—the ovolo, the ogee, cyma, torus, bead, hollow, and scotia, the fillet, and fascia—had been unalterably established. After a few words on polychromatic decoration, the transfer of the style to Rome was arrived at, and the career of the art pursued from the age of Augustus to that of Constantine. Although religious edifices still led the way, there was now a vastly expanded field of operation; embracing villas, baths, theatres, bridges, and aqueducts, triumphal columns, and archways, and notably basilicas. The same epoch of civilisation was still in progress, but the luxury, wealth, pomp, pride, and private patronage, of the Roman Empire were altogether peculiar in their influence upon the art. New features also were still coming into view. Such were the pedestal, the pilaster, the arch, the dome, and the use of storied orders. The application of the arch structurally was dwelt upon, and its limited use artistically. The altered system of mouldings was also described, crude circular curves being substituted for the refined elegance of the Greek contours. On the whole, concluded the lecturer, the philosophical and fastidious grace of the Greeks, to this day unequalled in the world, had given place to mere grandeur and luxury under the Romans, which in course of time led the art more and more into decadence, to be with all other products of Classic intellect in the fulness of time entirely overwhelmed and lost, until a thousand years afterwards their remains, and even their ruins, should be searched for and exhumed to form the basis of modern civilisation.

In the third lecture, the subject was the Architecture of the Middle Ages, and the point of departure was A.D. 500. Nearly a century and a half ago, the Roman emperors had taken refuge from the barbarians in the new metropolis of Constantinople, established at the extreme east of Europe. Only a few years ago the ancient capital, Rome, had at length been captured by the Goths. A few years more and it was to be finally pillaged, and the remnants of ancient magnificence and taste swallowed up. Two great forces had been at work in this: the pressure of barbarism from the West, and that of Christianity from the East. If architecture were history in stone, here, again, must be the origin of an entirely new system. But, in the scheme of the Dark Ages there was to be another element. While Christianity was to govern East and West, a similar new religion was to possess a Southern field. The Western nations, seeking a better faith, and adapting the Christian principles to their own habits of thought, founded the Latin or Roman Church; the Eastern nations, in like manner, formed the Greek or Byzantine Church; and Mohammed, animated by the same purpose, but rejecting Christianity because of image-worship, established the creed of Islam. And, accordingly, there arose three corresponding modes of architectural art: the Romanesque of the Latin Church, the Byzantine of the Greek Church, and the Saracenic of the Moslems. Turning now to the Basilica, or Hall of Justice of the Romans, this was described as the type for future Christian churches; the plain rectangular house, with longitudinal ranges of columns supporting the roof, the entrance at one end generally, and the seat of justice in a recess at the other, obviously serving the precise purpose of the primitive Christians, whether of the Latin or of the Byzantine sect. The sixth century, however, did not accomplish much of permanent durability: it was notable only for the name of the Emperor Justinian, under whom, for the moment, many great public works were carried out. Amongst the rest, there were certain basilicas or churches; although the greatest of all, St. Sophia, at Constantinople, was an exceptional design scarcely to be dwelt upon. The seventh century being

of little mark, the eighth brought the age of Charlemagne, under whom great exertions were made to advance learning and art, but again with little effect. Many churches, however, are dated from that period, still keeping more or less to the old basilican form. The Saracens, by the way, had by this time attained to considerable knowledge and taste, for Bagdad was now flourishing in the East, while Cordova was being built in the West. The ninth century exhibited great disorder, consequent upon the disruption of the empire of Charlemagne. In architecture, St. Mark's, at Venice, almost alone seemed worthy of notice, although still an exceptional work. Arab art during this century continued at its best, as well as in the next; in the course of which, on the European continent at large, the nationalties were acquiring form and character, as exhibited in architecture by a variety of German and French churches of much antiquarian interest. But it was not until the ensuing eleventh century that we could be said to reach firm ground. Various cathedrals throughout Europe marked the age of the growing authority of the Popedom, the First Crusade, and our own Norman Conquest. In a word, the Romanesque in Western Europe had become, by the process called in science degradation, either Norman or its equivalent. The Byzantine in the mean time might be said to have passed eastward, following indeed its Oriental character, into the Saracenic and the style of the Russian Church. The critic would perceive up to this stage the following innovations. Whereas the Greek mode had established the colonnade, the entablature, the mouldings, and the portico, and pediment, with very little of "wall design," and the Roman mode had added arching, arcading in colonnade, pilastering, and a good deal of wall work, the Romanesque had established aisle plan, cruciform, and round plan, arcading proper (not in colonnade), simple vaulting and domes, elaborated wall work (as at Pisa), roof design, gable design, tower design, and sky line. Attention being now confined to England, as furnishing a local history of Gothic architecture sufficiently illustrative of the whole field, the lecturer proceeded to explain from the drawings on the wall the well-known characteristics of Norman design, describing its details as being crude and its ornamentation clumsy, although picturesque enough in their way. But the following age of the thirteenth century, he said, brought out a very different state of the art, under new social influences. The Papacy was in its full ascendancy, and the clergy controlled society. The mendicant orders added their especial local influence over the people at large. The building fraternity, no matter in what particular form, had acquired organization and knowledge. Finally, the introduction of the pointed arch afforded a specific basis for a complete revolution in architecture. Whatever difficulties of an archæological kind might surround this last question, the structural solution was enough for architectural criticism. The art had accepted arcuation, pure and simple, with all its indefinite conditions to follow. Arcuation was the architecture of small stones (the Classic mode being that of large stones), and a little examination would satisfy any one that the pointed arch was at once a condition of complete arcuation, and that the first attempts at its use would be the most sharply pointed in character, as was the fact. The lecturer proceeded to explain the progress of design through the thirteenth, fourteenth, and fifteenth centuries, dwelling more emphatically upon the severe elegance of the earlier work, the graceful tracery and foliage of the middle period, and the fan-groining, carpentry, and flying buttresses of the later time. The exquisite development of plan he also described in warm terms, especially in Continental cathedrals. Metal work, colour decoration, proportion, and symbolism were also mentioned. Finally, the great critical merits of Gothic architecture were two,—arcuation carried to every possible limit, and articulation exhibited in most instances with a truthfulness or guilelessness which of itself was one of the most exquisite elements of art.

Working Men's Club, Great Quebec-street, Marylebone. — Classes for practical, plane, and descriptive geometry, mechanical and machine drawing and building construction, have been established at this club, under the direction of a certificated science teacher, thus affording to artisans an opportunity of acquiring a scientific training in connexion with the recreative advantages afforded by institutions of this nature.

NEW INFANTRY BARRACKS FOR GLASGOW.

Our friends on the Clyde are in fortune's way just now, and may congratulate themselves accordingly. Not only has their new Court-house "presently," as they say, been opened, and many other improvements of various kinds projected, but a new Infantry barracks has actually been begun. The old military quarters in the Gallowgate, in the very centre of this very populous town, were long ago condemned for various reasons, any one of which was sufficient for the purpose. First of all, they were very unsuitable, inadequate, and badly arranged, not only according to hygeinic principles, but to the comfort and convenience which we deem necessary to the life and character of the improved soldier of the present day. Then, again, the numerous whiskey-shops, and their ever-attendant evil companionships, not only seriously interfere with the soldier's physical status, apart from his moral one, but, what is equally bad, are standing impediments to military discipline. It has been long lamented that, even under the most favourable circumstances, drunkenness is the gigantic standing crime in the army; whilst that other evil, which must not be mentioned to ears polite, is its standing disease. With respect to the first, nothing but improved quarters, both physical and educational, sufficiently far removed from towns,—especially garrison towns,—to render street temptation difficult, will answer.

Thirty acres of undulating ground have been purchased, situated about two miles and a half from the city of Glasgow, in a north-westerly direction, near Maryhill, and able to command communications by road, railway, and canal. The widely-known "Kelvin Grove,"—although grove no longer, but villa-terraces, and wealthy suburban nestlings,— rendered classic by the poetry of Burns, is in the immediate vicinity. The scenery is of the most lovely kind; and if the future regiments to be quartered there have but a corresponding happiness within, then, indeed, may they enjoy themselves, and sing aloud that "We are in a military paradise." The name of the particular locality is Garioch, and the immediate plot of ground upon which the buildings are to be erected is opposite Jeffrey's weaving factory, on the Glasgow and Maryhill road.

Of the whole quantity of land which has been purchased, about eight acres will be built upon, and otherwise appropriated to military purposes. The main entrance will be by iron gates in the Maryhill-road, with a second gate in the Garioch-road. On the right hand of the main entrance will be a guard-room and temporary lock-up cells; whilst on the left-hand side will be the regimental offices, orderly-room, court-martial room, prisoners' room, &c. Taking the main entrance to be approached from the east, away on the north side, having a southern aspect, will be the officers' quarters; in the rear of which will be all the necessary domestic offices, outhouses, &c., and stabling for seven horses. These quarters will front directly across the barrack-square, and face the men's block. The disposition of the officers' rooms will be in this way:—The commanding officer, as befits his position, will have separate accommodation to himself; not only that, but, on the well-founded conclusion that he will generally be a married man with a family. His servants will, also, be provided for, away from the servants of the other officers.

The next arrangement is for three field officers with two rooms each, and thirty-four officers with one room each; such room being so planned that there will be a recess sufficient for a bed and bed-screen, so as to enable the occupant to convert his "bungalow" into a snug sitting-room at pleasure. In addition to these rooms, there will be nineteen others adjoining for officers' servants. So much for the private apartments, if they may be so termed. A second portion of these quarters will comprise a complete officers' mess establishment, including ante-rooms, billiard-rooms, smoking-rooms, and such similar accommodation as the social rank of gentlemen of whom officers are composed may require.

We now cross the parade-ground, or "barrack square," as the soldiers call it, and we come to the homes of the rank and file. The square will be the enclosed quadrangular space, formed by the three sides of the projected buildings, and the western section of the barrack boundary wall. This parade-ground will be 580 ft. by 486 ft. As the contour of the land is of a very wavy nature, and as it will have to be made perfectly level, a good many hillocks will have to be placed in the bosom of a good many hollows; in other words, there will be a good deal of what Scottish builders call "getting and filling." The men's quarters are in two divisions, each division being in parallel blocks behind one another, the dividing buildings being the school-chapel, gymnasium, &c., at right angles. The division on the left-hand side, from the barrack-gate will be exclusively for the married "department" of the regiment. The married private soldiers will have rooms to accommodate forty men, their wives, and children. In addition to these will be the necessary accompaniments of school, laundry, hot-air drying-closets, lavatories, &c. Away in the corner, to the rear right, will be the infant schools; so that the married people and their families will be entirely to themselves. On the same side of the square, but by themselves, there will be quarters for five staff-sergeants, having two rooms each; sixteen staff-sergeants, with one room each; twenty married sergeants, one room each; twelve single sergeants, one room each; and eight other non-commissioned officers' rooms.

There will, also, on a plan similar to that for the officers, be a complete sergeants' mess establishment, with mess-room, billiard-room, cooking house, stores, &c. The staff-sergeants and sergeants' quarters will be to the west of the single men's division, with ample space, isolating them, in accordance with their rank.

It will thus be seen that the non-commissioned officers of a regiment need never, if desirable, come in contact with the men when off duty for any purpose whatever. To the rear of the staff buildings will be the military provost's establishment, small, but very handy and compact. There will be quarters for the provost sergeant and assistants, an office for the counting-house, part of his unpleasant business, a detention-room, hard-labour yard, and twelve quiet, unobtrusive cells. In fact, from what we can learn of this part of the general plan, a year or so's "moonlight furlough" may be passed here very "comfortably" by the chastised and humbled penitent of the court-martial. Let us hope, however, in all seriousness, that there will be little or nothing to do for the iron-hearted terrible "provo."

There will be four blocks for the single men; two of two stories high, and two of three stories. There will be 240 men in the two-story blocks, and 360 men in the three-story blocks. There will also be two cook-houses, each capable of cooking for more than 300 men; whilst a library and reading-room will supplement the culinary department by providing ample food for the mind. In order to have cleanliness made easy, there will be lavatories immediately adjoining each room; in addition to which there will be the inestimable benefit of a bath-house, and recreation facilities of every kind.

Having provided for cleanliness, the authorities show that they are not unmindful of the next and higher virtue in a manner that must be pleasing to many a heart that beats under a red coat. Hence, in the chapel-school the accommodation for divine worship will be enough, or more than enough for the English church portion of any regiment.

The chapel-school will seat 330 rank and file; 60 women and children, and 40 officers and ladies for divine service; whilst for educational purposes, there will be room for the instruction of 100 adults. The seats in the central part of the floor will be movable, so as to convert the chapel into the school, and *vice versâ*. There will be both schoolmaster's and school-mistress's quarters attached in close proximity to the scene of their labours. The gymnasium will contain every appliance of the modern system, including bars, climbing poles, ropes, &c., and will comprise in addition a racquet-court, a fives-court, and a skittle-alley.

Behind the single men's block will be the canteen, which, it has been said, will be under such personal supervision of the officers' committee as to prevent the adulteration of liquors on the one hand, and drunkenness on the other. The question of canteens has long been under the earnest consideration of competent military reformers, with the view of making the most of them for the soldier and the soldier's family. They have hitherto been too much left in the hands of the landlords or contractors, who have sold bad articles at dear prices. How to manage them efficiently for marching regiments has presented some difficulty, on account of the officers of such regiments having little knowledge of, and

less inclination towards, business matters. Besides, such officers are, comparatively, so short a time in each town that there can hardly be sufficient inducement for them to trouble their heads with canteen affairs. At Woolwich and Chatham the difficulty disappears, because there is always a staff long enough in the place to deal with canteen abuses if it has the will and the power. On the other hand, in the case of line regiments, who generally enter towns knowing as little what the day's pay will buy as if the men dropped from the clouds, it would be well and wisely done to have canteens and their doings placed under the supervision of the civil branch of the Royal Engineer staff of the district; or, should there be no civil branch, then the Engineer staff itself. In the building under notice, the canteen will virtually comprise a shop-store, where the soldier or his wife may purchase every article required in the sphere of their daily existence.

The canteen will be divided into two distinct portions—the family shop on one side and the public-house part on the other; each will have separate entrances away from one another.

Behind the staff-sergeants' quarters, on the southern side, there will be a new feature, namely, a pensioners' department. This will be very advantageous, because it will enable the pensioners to be mustered, instructed, or dealt with in a military atmosphere, and upon military ground. The regimental band, too, will have a specially adapted room for itself. A powder-magazine will be constructed in a part of the ground that may be deemed to be the best suited for the purpose; whilst a very convenient armoury is among the arrangements. Referring to the hospital for one moment, it has to be stated that there will be a suitable mortuary, with all the requisite appliances for surgical operations, *post-mortem* examinations, &c. The whole of the external walls of the buildings will be of stone; brickwork being used in the interior. Ventilation will be by both shaft and piercings, when necessary. The lighting will be by gas; the filthy room-tubs will be superseded by night urinals, kept at a temperature, so as not to chill the men frequenting them in winter, and open only during the night. Each floor, too, will have its own corridor in the rear, so that men may pass from one floor to another without being wet, or having to dress themselves, beyond barrack-room costume. There will be a supply of hot water for all purposes at all hours. In all the rooms for the single men the windows have been so planned that two beds will stand between each pair of windows. The whole of the buildings will be inclosed by a rubble stone wall, with rustic copings, 10 ft. high, and 20 in. thick. This wall has at the angles projecting turrets loop-holed for musketry, so as to sweep the entire face of whatever line the fire may be directed upon. The particular style of walling has not, we believe, been determined on, but it is supposed that it will be either rubble or coursed work, with mullions and dressings.

The walling is to be of sandstone from the quarries of Stockenfield or Kelvindale, and the other stone used for dressings to quoins, windows, staircases, chimney-caps, &c., to be freestone from the Hunter's-hill or Gifnock quarries. In the draining of the ground, 2-in. agricultural pipes will be used, whilst for the buildings glazed stoneware pipes will be laid down. In the external walls, the ventilating inlets will be of terra-cotta air-bricks for the floors, and galvanized iron ventilators overhead. There will, also, be extracting flues for the foul air, of glazed stoneware piping, and air-ducts to supply the fire-grates.

The ground floors of the lower part will be laid with 3-in. Arbroath dressed flagging; but the corridor floors of the upper stories will be freestone landings 4 in. thick, supported on wrought-iron bearers and girders. The floors to the hospital wards, lavatories, mess-kitchens, &c., to be on Fox & Barrett's fire-proofing principle, resting on rolled iron joists. Asphalte, too, is to be used wherever it may be requisite to prevent damp and noise. Wherever it is practicable the chimney-flues will be constructed so as to be swept from the outside. The lavatories, closets, and urinals will be exclusively supplied from cisterns of their own, and no other pipe will be attached to them. The hospital will be warmed both by open fire-places and hot water. The heat will be delivered from a cylindrical wrought-iron boiler, 4 ft. by 2 ft., cased in fire-brick, with a recess-furnace front, and set in the hospital kitchen. The hot water will start through a 2-inch flow-pipe, passing under the roof of the covered way into the principal staircase. On the entrance to the wards the dimension is reduced to a 1¼-in. pipe, with the requisite stop-cocks on the landings. The circulation will return to a galvanized wrought-iron cistern of 150 gallons capacity fixed in the centre of the building, and so back again to the boiler. From the hot-water cistern a 2-in. escape-pipe will pass through the roof, turning down towards the gutter. Gas will be laid on in every part of the establishment where gas can possibly be useful.

The Glasgow people have been long complaining that the vast property of the third great seaport of the empire should be left in so comparatively an unprotected state. It is now many years,—more than twenty,—since the cavalry were removed from the old barracks in Eglinton-street, and what is the result? Why, that on any emergency troopers must be sent for all the way to Hamilton, ten miles off! This was actually the case during the late Sunday Fenian demonstrations.

These barracks have been designed by the Civil Professional Branch of the War Department, under the direction of Lieut.-Col. Murray, R.E. The warming and ventilating arrangements were supervised by the Army Sanitary Committee. The designs have been submitted in detail to the Queen, and have received her Majesty's approval and signature.

The contractor for the whole of the work is Mr. John Kirk, of Woolwich, who has just completed the fortifications of Newhaven. Although no special time has been fixed, it is expected that the barracks will be ready for occupation in the latter part of the autumn of 1872.

THE MANAGEMENT OF COMPETITIONS.

I VENTURE to suggest, that the time has arrived when the Institute (with every advantage both to the public and our profession) might take up the general regulation of competitions. If it were once understood that we declined as a body to compete unless the conditions issued were those framed by the Institute, much of the existing evil would be removed.

I propose that a list of architects willing to act as competition judges be kept at the Institute. They would serve in rotation, or if business prevented one of them, the next on the list would be requested to attend.

Ample advertisement should suggest reference (by any promoters of competitions) to the Institute, and on application being made the first architect on the list should proceed to the site of the proposed work, there confer with the committee, and prepare the requisite conditions, signing the names of the intended judge or judges. The conditions would, of course, be carefully framed in "schedule" form, the details of which need not at present be discussed; but I foresee a great saving of labour from this source alone, as a mere glance at the schedule would suffice to show competitors the nature and extent of the work.

Everything should be done to insure absolute uniformity, in the scale, the sizes, and the colour of all drawings. The perspectives, perhaps, may be unrestricted (except as to size), as they will not mislead a professional adviser.

The memoranda issued to architects should be divided into "Instructions" and "Suggestions," the former to be absolutely binding, the latter not so; then if the cost were stated under the "Instructions," any palpable excess would absolutely exclude a competitor; but if it appeared as a "Suggestion," then the designs should range in their order of merit; the authors of the first and the second designs thus selected receiving a fee previously decided upon, but any other design which would come within the limits of cost, and was most in accordance with other requirements, ought to be chosen for execution.

Rules for measuring the work would be supplied, and the price be founded on the cubic contents of the building and the superficial area of external walls.

A printed form for the report to accompany each design would be issued for the competitors to fill up. This would greatly facilitate examination, whilst additional matter (to a limited extent) would be permitted.

Half the designs sent in should be numbered in their order of merit (unless utterly worthless), the numbers to be affixed and a list of the authors' names to be registered at the Institute and published.

All drawing should be exhibited to the public, unless individuals express a desire to the contrary with reference to their own. I have seen many instances of injustice which could scarcely have occurred had the public been admitted to see the drawings; and I think, moreover, that if we consent to exercise our hands, heads, and hearts in such work as this, we might at least allow our productions to do some little good to others. Our drawings would thus help to elevate the public taste and improve the daily increasing feeling for architecture. To us they are of little value; our time, labour, and materials have been well-nigh wasted.

I many years since elaborated a scheme, of which this is a bare outline, and I think the matter of such importance, of such absolute value to the profession, that if there be any difficulty at first in placing it before the public we should find it well worth our while to subscribe amongst ourselves, and form a fund to carry out the scheme.

I should be happy to confer with any of my brethren upon the subject, and to add my contribution. The time seems to have arrived when a little united action would carry us safely through the worst of the evils attending our unavoidable competition.

AUGUSTUS FREERE.

SCHOOLS OF SCIENCE AND ART.

The Wolverton Science and Art Institute.—The anniversary of the opening of the science classes in connexion with this institute has been celebrated by a public tea, to which between four and five hundred sat down. The tea was followed by a musical entertainment and the distribution of prizes to the successful students for the past year. Mr. J. B. Bickersteth, a director of the London and North-Western Railway Company, occupied the chair.

Technical Education in Bedford.—A lecture in connexion with the local class in technical science has been delivered at the Working Men's Institute, Harpur-street, by Mr. Buckmaster. The chair was taken by Mr. James Howard, M.P. Mr. Fry read the report, showing that out of fifteen who presented themselves for examination twelve had been successful. These had been classed as follows:—First class, three; second class, three; third class, six. Those who obtained certificates in Class 1 were entitled to Queen's prizes. The books were presented in course of the meeting.

The Torquay School of Science and Art.—The presentation of prizes to the students of this school who have successfully passed the recent examinations, has taken place at the school. The duty of presenting the prizes was undertaken by Lord Talbot de Malahide, in the absence of Lady Palk. The chair was taken by the president, Mr. E. Vivian; and the room was crowded with a large, interested, and sympathetic audience. Mr. Luxmoore, the hon. secretary, said, it was satisfactory to know that the school during the past year had done a great deal more than any school almost in England,—certainly better than any school in the West of England. The Art School had 85 evening pupils, and 75 day pupils; the former were mainly of the artisan class, to whom the Government gave most of the prizes now on the table. Of these 85, the majority went in for the examination in May last, and 31 took prizes; one pupil in particular, Mr. Easterbrook, gained the Queen's prize and bronze medal. Mr. S. Youlden was also specially mentioned. In the Science classes Torquay held a high position; during the past year 90 students went in for examination,—70 in electricity, and magnetism, of whom 54 passed successfully, 18 gaining first-class Queen's prizes; 18 second-class, and 13 third. Here, again, Mr. Easterbrook had come forward, and in magnetism and electricity he stood the highest of all the students in the kingdom; for this he should have received the gold medal, but, owing to a clause in the regulations, he was debarred from taking it. He also stood third in physiology in the kingdom, and having gained those two prizes, he would now go to London, it was to be hoped, to win more. At present there was in the school a physiological class, with 20 students; a class for acoustics and heat, with 32; and a class for electricity and magnetism, with 70 students. There were also, on Saturday afternoons, classes for ladies and gentlemen, which had not long been started. The Chairman, in course of the meeting, called upon Mr. H. Bridgman, who was the means of bringing about the establishment of these schools,

to say a few words. Mr. H. Bridgman, who was very heartily applauded, made an interesting speech of considerable length. He alluded to the progress the school had made since the first preliminary meeting, held in a small room, in Lower Union-street, in 1866: it had gone on and prospered, and no doubt it would continue to do so, for, during the last two years, he found that no less than 180 pupils had passed their examinations.

Exeter Science Classes.—The annual meeting of the friends of the Exeter Science Classes, held at the Athenæum, was remarkably well attended. A lecture "On Technical Education" was delivered by the indefatigable Mr. Buckmaster. The Rev. W. David said the science classes could be made of great value to the citizens. He had been a member of one of the first classes that had been formed in Exeter, and had a very lively recollection of the pleasure and instruction he derived from the teaching of Mr. D'Urban in the geology class. Mr. D'Urban's pupils certainly were few. Beginning with seventeen pupils they had dwindled down to three, but he hoped to see the classes well attended in the future. He regarded those schools as filling a present void in the course of education in England. On the proposal of Mr. Cotton, a vote of thanks was unanimously accorded to Mr. Buckmaster.

Carlisle School of Art.—The annual meeting of the subscribers to this school has been held in the school-room, in Finkle-street, the mayor (Mr. W. I. R. Crowder) presiding. A large number of pupils and their friends were also present. The secretary (Mr. T. H. Hannah) read the report, which stated that the duties of the school had been performed to the entire satisfaction of the committee by the master, Mr. Lees, and the pupil teacher, Mr. Parker. Owing to the examination of those subjects of the Science and Art Department which have been regularly taught in Schools of Art, such as mechanical and geometrical drawing, building, construction, &c., having been placed under the Science branch of the Department, the examination of those subjects, which was formerly held along with the art subjects proper in March, would now take place in May. At the examination of the school in March last, 43 students were successful, of whom 9 gained prizes. Last year the numbers were respectively 27 and 7. During the year 75 students had sent 316 drawings for examination in London. Of those Mr. Edward Parker, the pupil teacher, gained a silver medal in the national competition for a study from the antique; 3 obtained third grade prizes, and payments were made on the work of 61 others. Last year, 58 students presented 108 works for examination. The committee had great pleasure in stating that the master, Mr. Lees, had obtained one of the prizes offered by their lordships to the "head masters of those schools in which the result of instruction, as tested by the Department examination, was most satisfactory." Owing to the number of artisans in the evening class being so large that there was scarcely accommodation for them if they were all present, the committee had made arrangements with the committee of the Mechanics' Institute for occupying their large hall in Fisher-street. The financial statement showed that the income of the school during the past year, including a balance of 24*l.* 14*s.* due by treasurer per last account, and after making certain reductions, had amounted to 90*l.* 5*s.* 6*d.*, of which sum 27*l.* 18*s.* 6*d.* were derived from annual subscription, and 64*l.* 17*s.* from school fees. The expenditure had amounted to 62*l.* 18*s.* 3*d.*, so that there remained a balance in the hands of the treasurer of 28*l.* 7*s.* 3*d.* Mr. Edmund Potter, M.P., distributed the special prizes, and addressed the meeting on the subject of art schools.

CROWN POINT, NEAR NORWICH.

The mansion that Sir Robert Harvey, bart., is erecting on his estate at Crown Point, near Norwich, is approaching completion. The new hall is situated on gently rising ground in the freshly-made park at the rear of old Crown Point House, and is visible from the Kirby and Bungay roads, the main approach being from the latter, from whence an open drive, skirted on each side by plantations, leads across the Kirby-road to the hall. There are two lodges, one at the Bungay-road entrance, and the other at the Kirby crossing, both in the style of Swiss architecture that characterises the water-side lodges, gamekeepers' cottages, and other minor buildings on the estate. The mansion is in the Elizabethan style, and the chief entrance is covered by a portico of iron-work, with cupola roof. The ground floor comprises a saloon, separated from the hall by a screen; a dining-room and two drawing-rooms, *en suite*, with conservatory beyond, breakfast-room, library, billiard-room, &c. On the upper floor are bed-rooms, with double dressing-rooms, &c. These rooms have bay windows, from which views of the park and surrounding country are obtained, comprising the Lakenham Viaduct, the Castle and Cathedral, Mousehold House (the seat of the late General Sir R. J. H. Harvey), Thorpe, &c. On the third floor are more bed-rooms, the total number in the mansion proper being twenty-four, and there are thirteen others over the servants' apartments and offices. The hall will be lighted with gas. At the rear are a range of stables, with carriage-yard and riding-school, the whole enclosed under a covered glass roof, 180 ft. long and 40 ft. wide. These will, in a year or two, be concealed from sight, by plantations of choice shrubs and evergreen trees, by which they have been flanked. The transformation of what but little more than a year ago was an open field into an ornamental park, has been accomplished with great success. A terrace walk will extend in front of the house, which faces the south. Beneath it will be a summer garden, and other gardens stretch away to the east, and are now in course of formation; a rosary, and some picturesque rockwork overhanging an artificial cave, from the mouth of which a lion is peeping (the work of Mr. Barrett, of Norwich), being the most recent work of Sir Robert's gardener. The mansion has been built from the designs of Messrs. Coe & Peake, of London, architects. The contract for the offices was undertaken by Mr. D. Balls, of Norwich, and the work being divided into two contracts, Mr. J. W. Lacey was the successful competitor for the hall—at least, with the exception of the fittings and decorations of the lower rooms, which, being of an unusually elaborate and ornate character, will probably be confided to a London firm.

A NEW CHAPEL IN PLYMOUTH.

A large Baptist Chapel, which has been in course of erection for the last sixteen months, upon Mutley Plain, has just been opened. In style it is of the Palladian type, and the façade contains a considerable amount of ornamental as well as constructive detail. The chief feature is a central arch opening into a covered recess, and extending from the ground to the pediment. This is flanked on either side by towers, which rise to the height of 90 odd feet from the foundation. The main doorway is in the recess, and there are side entrances in each tower, which also afford access to the gallery. The sides of the recess are carried up by columns, which in the lower story are Doric, and in the upper Corinthian, surmounted by carved capitals. There is a three-light window, with Corinthian pilasters, over the chief entrance, and smaller windows over the others to accommodate the gallery stairs. The entablatures, and the mouldings generally, are bold. The towers are surmounted by truncated pyramidal slated roofs, with creatings of iron-work, painted and gilt. The material of the building throughout is of limestone, and the columns and dressings generally of Portland, while the steps are of granite. The pulpit is of wood, and octagonal. The seats are all open benches, and, together with all the woodwork, of pitch pine. The chapel is lighted at night principally by two sun-burners in the centre of the ceiling. There is a school-room in the basement, to accommodate 500 children. The building is close to the Mutley tunnel of the South Devon Railway, and, including the site, has cost 8,000*l.* Mr. Ambrose, of Plymouth, was the architect employed, and Mr. J. Finch the general contractor. Mr. Harry Herns, of Exeter, has executed the stone-carving; Messrs. Plimsaul put up the heating apparatus; and Messrs. Monk & Westlake the gas-fittings.

Olney Church.—This church, interesting, from its association with Cowper and Newton, has for some time past been sadly in need of repairs, but we are glad to learn that an effort is now likely to be made to restore it to its proper condition. The lord of the manor (the Earl of Dartmouth) has undertaken the restoration of the chancel, according to the *Rock*, and it is to be hoped that other friends will be found to help the vicar in his greatly needed work.

ART IN COMMON LIFE.*

I must clear the way for what I have to say on art by limiting my subject. I shall not have time, and I have not the power, to speak at all of the so-called fine arts—of painting, of sculpture, or even of architecture. A picture, or a statue, or a fine building is indeed an ornament, in one sense of the word. It adorns a room, or a public building, or a town; but the principles which regulate the work of the successful painter, sculptor, or architect are far more complex than, though not really different in kind from, those which are concerned in making beautiful, adorning decorating objects of daily or occasional use. In considering ornament, then, I confine myself to a study of the principles which should guide us in determining the true nature of ornament, and its proper employment. Moreover, I exclude painting and sculpture now, because, when good, they are and must be always costly, and therefore not within the general reach,—the paintings, and statues, and carvings, are often the treasures of the cabinet of an individual. Even if public taste were educated sufficiently to understand such works, they are usually inaccessible; and it should be added, that the real merit of works of fine art does not come out when they are small and apart from each. A large painting on a wall of a public building, boldly treated, illustrating some instance of bravery, charity, or devotion, and surrounded by proper architecture, of which it indeed forms an essential part, is not only of general instead of special use, but produces in the spectator a sense of the sublime, which a small picture that can be looked at by one person only at a time, which must be pored over in the hand, cannot ever achieve.

The question may be asked—Why ornament at all? We know that the earth itself is adorned, and that the so-called savage, half-civilised, and highly-cultivated nations have invariably led them to colour their various war-clubs, paddles and canoes, and that the colours and curves of these Fijians, Sandwich Islanders, and others may be called ornamental. Instinct so called of man, savage and half civilised, as well as most cultivated. In ancient pre-historic times the cave-dwellers scratched on bone or pottery rude outlines of the animals they slew or tamed: the palaces of Nineveh are lined with sculptured slabs where palms and various forms of plants are drawn, with warriors, captives, and kings, and the spoils of battle: the seals and many ornamental objects of the Babylonians survive to our times, beautiful with minute and laboured devices. The architecture of Egypt has furnished models of excellent colour and of quaint form to our artists of the present day. The palm of the deserts and the water-lily and rush of the Nile were pressed into the service of decorating their temples by this ancient people. If we go further east we shall find in China and in India an excellent taste for colour, and some notions of form, handed down from ages, the exact distance of which from our own day, though great, is not exactly known. Time would fail me were I to endeavour to allude even to the chief styles of ornament prevailing in Greece and subsequently in Rome; of the wares of Etruria; of the metal, stone, wood, and ivory work of the Middle Ages; of the early Irish illuminated missals before the tenth century of the Christian era; of the works in carved wood of early Norwegian carvers; of Mediæval Arabic inlay; and of the period of the Renaissance or Revival of Classic Art. But the principles of true ornament may be deduced from nearly every kind of decoration, whether Greek, Italian, Egyptian, or Chinese. What these principles are I will endeavour to state.

A. Ornament as to its nature should be *human*; that is, should appeal to the eye, the thought, the affections of man. It must have a meaning, and the more meaning the better. Where possible it should possess as many as possible of the following properties or characteristics; it should be:—

1. (*a*) Local, (*b*) Historical, (*c*) Public, (*d*) Fixed, (*e*) Large.

It should also be:—

2. Informative and truthful. If it seems to represent anything it should represent it truthfully as far as it goes. More rich and beautiful the more extensive the knowledge which contrived it and the knowledge which it imparts. Study necessary both on the part of the artisan and the public.

* By Professor Church. Read at the Cirencester School of Art.

B. Ornament in its application should be *appropriate.*

(*a*) Adapted to the use of the object decorated.
(*b*) Adapted to the material to be decorated.
(*c*) Capable of sufficiently good execution by trained ordinary workmen.

A. Human character of true ornament.

1. Local, Historical, Public, Fixed, and Large.
2. Informative, Real, Ideal, Conventional, contrasted.

B. Appropriate,—as to material and colour; as to use; as to nature of the executant or artificer.

From these, the conditions of ornamentation, we may trace the origin and real character of conventionalism. The great colourist of Venice, the great sculptor of Greece would convey the greatest amount of truth, produce the best ornament. But we have to limit ourselves in various ways. Titian's colour and the statues of Phidias are not for every day's use. We lack the men—the genius—the skill for work like theirs, we also want to turn our ornamented objects to the purposes of common life. We cannot copy nature perfectly to begin with in her full spirit, her full variety, her force, her tenderness: we must learn what we can keep, what we must omit. Then we come to the second reason for conventionalism, the use of the objects to which ornament is to be applied. Ornament must never interfere with use: it ought not to hinder, but to aid the proper employment of any article of common employment, and it should be appropriate to the object. Do not put wreaths of May blossoms or gaudily-painted pictures or photographs under glass on your coal-scuttles. A third limitation is imposed by the material. Bits of rich glass for a coloured window; of marble and stone for a pavement; a wavy line for the border of a dress; abstract forms of flowers and birds for paper on your walls; lumps and bosses and slings of molten glass upon the tumbler and the vase; sharp, clean-cut patterns reminding you of material forms of beauty, cut out in brass or hammered out in iron, or engraved in silver.

But although all ornament must be suitable to the material and adapted to the use of the object decorated, and to the skill of the workman, the conditions thus imposed upon the direct copying of nature for purposes of ornament must not lead us to forget the first principle laid down that ornament must be human, it must appeal to man. It must not be senseless,—meaningless. Let us study the several necessary conditions of deriving ornament from nature by a fair example.

Plants lend themselves readily to the decorator. Where nine workmen can carve some semblance of a flower, one only can represent anything like an animal form.

Ivy: its freedom, its variety, its curves.

Periwinkle. Bramble. Rose calyx. Clover.

A more severe treatment is required the less tractable your material.

But severe as the treatment may be, do not let it bind you down to a fixed bondage,—the bondage of the cast-iron schools,—a bondage which brought Gothic early in the nineteenth century into disrepute. Bring the freedom and variety of nature into your work, but discipline your abundant resources. Do not let stiffness on the one hand, nor extravagant curves on the other, interfere with the *unity* of your decoration. Fourteenth-century windows, their details varied, outline same, position influenced not by appearance primarily, but by *use.*

Some people may think or may say that my subject is a trivial one—not worthy of the attention of sensible men. There are some men who care nothing for a poem unless it conveys a satire or a jest, who do not care for any form of art, and I had almost said for nature itself, for nature is, as has been well said by an English writer, *the Art of God.* I ask you, then, consider whether or no my reasons for forcing ornamental art on your attention are good. We have our work in this world; we have powers wherewith to perform it. Those powers must be trained if our work is to be well done. Are we to train all our powers, or only some?—put out some talents to usury; others lay up in a napkin, and bury in the earth? Shall we not work better in all directions if we add day by day fresh facts to our knowledge, accumulating power and the wisdom to it? Let the worker in iron learn first of all how to work the metal with skill and ease and certainty. Let him then learn how to make it into forms which shall, at least, not be ugly if not absolutely ornamental; but will it be of no service to him if he finds out in addition to all this how the iron was got out of the earth, and out of its ores; what are its properties and its components, and so forth? And he may gain advantage beyond his special handicraft by getting knowledge and hints from other arts. A man comes to the School of Art because he wants to "letter;" he learns this in a few weeks, and goes away content; but might he not have learnt more, and improved himself greatly had he looked a little further? A plain letter may easily be painted: what if he had got to learn to illuminate and design, and become known as an artistic and tasteful as well as a skilful workman? Thus I appeal to some of you on grounds of personal advantage. But I may do more. I may urge upon you the importance of developing new industries for the populations of the country, and improving those that exist on national, or social, or patriotic grounds. Honest materials, honest work, manual skill, artistic taste, and that wide and varied cultivation of the mind and hand which, applied to one's daily work, leads to invention and discovery, and the advancement of the handicraft and the country of the workmen.

Ornament and the study of its principles is a noble one: ornament may minister to a mere love of finery, unreasonable and indeed ridiculous, but this is merely one of the many ways in which anything excellent in itself may be abused. But the rich abundance and the curious variety of natural decoration at once provide us with material for our ornamental designs, and at the same time teach us the appropriateness of forms and colours to special offices. Dazzling sunlight and moonlight cold; the earth adorned with light, rolling on its course; the canopy of the sky variegated with stars and flashing with thousands of meteoric lights; the sunrise awakening the light of the world; the sunset, like the golden throne of the majesty of heaven, invested north and south by dark clouds like shadowing cherubim; the rooted mountains grand; the ocean, ceaseless in movement, varying in colour, lashed in fury of foaming wrath by the storms, or smiling with its innumerable ripples of light; the budding of the leaf; the blossoming and tender or rich colouring of the flower; the pencilling of the insect's wing; the special glory of the nature and form made in the divine image,—all these may speak to us of beauty and ornament, if we will listen and will learn.

A PLAN FOR WIDENING THE STREETS.

Of all the questions occupying public attention at the present time with regard to the improvement and well-being of the metropolis, there is not one of so much importance as that of making due provision for street traffic. The utter incompetency of the present width of street to the demands of public convenience has been long acknowledged, but little has been done to improve matters. The metropolitan railways, though they relieve the streets of a vast amount of passenger traffic, will never provide a remedy for the existing evil,—an evil which is daily increasing. The right thing to do is to widen the present thoroughfares; but the enormous cost of this, in the usual way of going to work, has been an almost insurmountable obstacle hitherto. A scheme, however, for doing this readily, conveniently, and economically, I now beg to submit to you, with diagrams.

In your Journal a few weeks back a suggestion was made to have an upper pathway in a line with the first floor of the houses; but the trouble, danger, and difficulty entailed by this scheme would be very great. I have long thought over the subject, and think the proposition I am about to make must, on consideration, meet with general approval and acceptance. It is this. To set back the present line of shops on ground floor 8 ft. or 10 ft., making the space so gained the public pavement. The upper and outer line of houses being supported by columns or an arcade. The advantages of this plan would be that it is easy of execution and comparatively inexpensive. Instead of purchasing the property outright, with costly outlay for leases, compensations, &c., as heretofore, only a limited portion of the ground-floor would have to be bought at the first; and when the term of lease was expired the whole of the house should then be set back, and only a limited indemnification would be necessary. The colonnade might be removed or not as thought most advisable. The gain to the roadway by this means would in many cases of city streets double their capacity. Leadenhall-street at one part is only 29 ft. 6 in. wide, *including pavements*, at present; but, on the realization of my plan, would with pavements be, say 50 ft. In Fleet-street, Ludgate-hill, and the Poultry, there are parts respectively 44 ft., 41 ft., and 37 ft. 3 in. All these I would make 20 ft. wider. In Newgate-street, where the narrow parts almost prevent the benefit of the wider portions being felt, my system might readily be applied, and the full width of street be obtained in a few weeks. In some cases I should only propose to treat one side of the street in this way.

Certain it is the exigencies of the public service are so pressing that something should be done to effect a radical improvement on the present state of things, and it is to be hoped that the *éclat* attending the opening of the new street and viaduct may result in the matter being taken actively and immediately in hand.

FRED. TAYLOR.

THE HOUSE OF NEWCOMEN, THE INVENTOR OF THE STEAM-ENGINE.

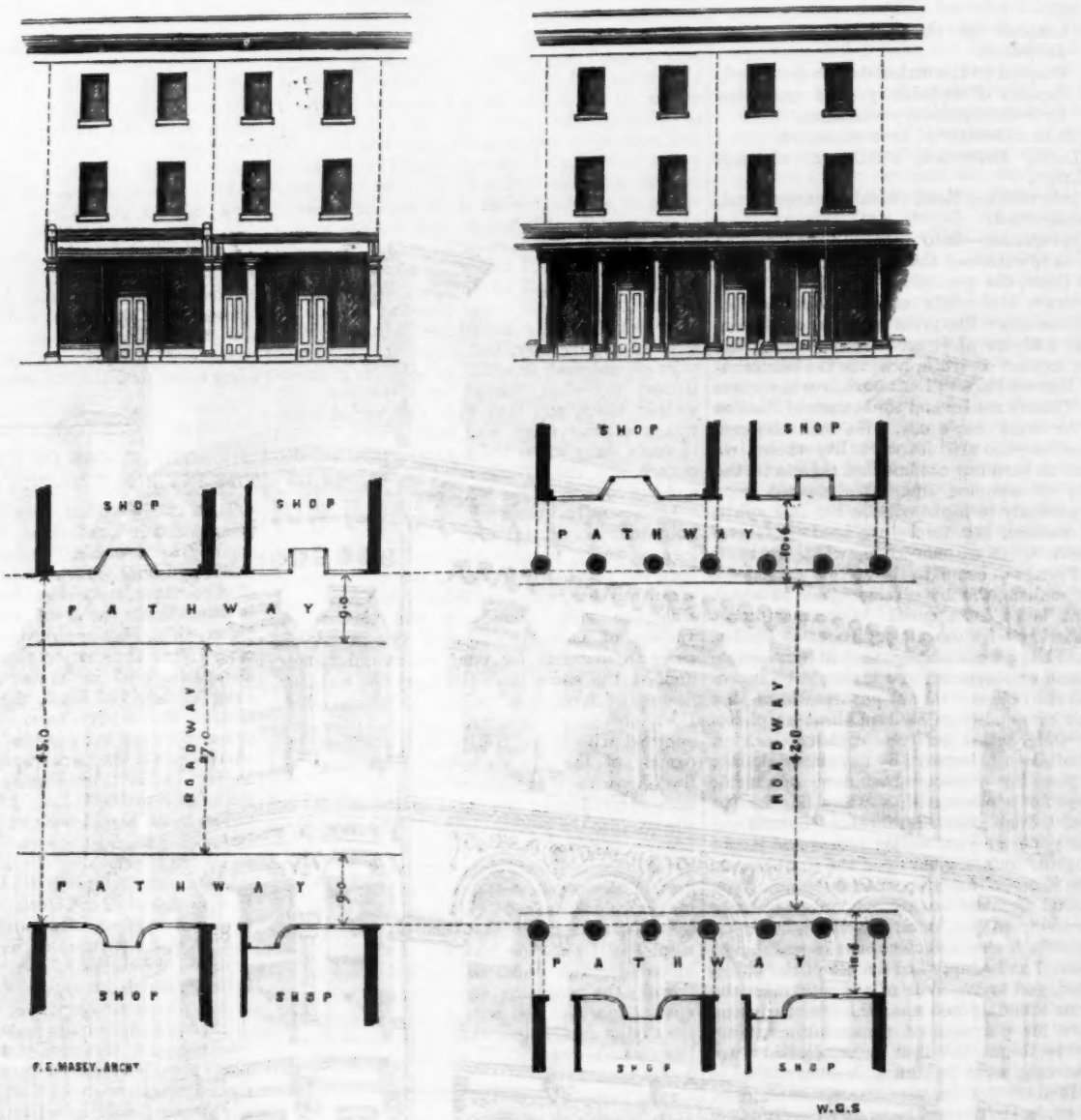
THOMAS NEWCOMEN, the locksmith, of Dartmouth, South Devonshire, first applied steam usefully as a motive power, and his was the chief hydraulic machine for about two-thirds of a century, and was found most valuable in the development of our mining system. Upon this Watt worked, and though Newcomen was thus superseded, his name should always be held in honour amongst us. The story since told of Watt, that he conceived the idea of the motive power to be obtained by steam by watching his tea-kettle, the cover of which would frequently rise and fall when boiling, has long been told in Dartmouth as relating to Newcomen.

The house in which Newcomen lived when he invented his engine was situated in Lower-street, in Dartmouth. In 1864 it was sold and taken down, by order of the local Board of Health, when Mr. Thomas Lidstone, one of a family of builders, of a hundred years' standing in that place, purchased the ancient carved and moulded woodwork of its street frontage and interior, which he rebuilt (1868) in Ridge-hill, in the parish of Townstall, in Dartmouth, carefully replacing in the sitting-room the clavel (*Devonien* for the wooden mantel) of the fireplace at which Newcomen, according to popular tradition, sat when he first noticed the action of the tea-kettle to which we have referred. With the view of preserving a knowledge of the old house, Mr. Lidstone has published a tractate containing these particulars, with several illustrations drawn on the wood by himself,* especially a sketch of the house as it stood in Lower-street before it was demolished, and one of the building he erected to work in the remains,—"Newcomin Cottage," as he calls it. The latter, as well for the cleverness as for the good feeling it shows, we reproduce. The grounds he has for altering the usual spelling of the name we do not know, and have therefore followed the ordinary mode, though we shall not be surprised to find him right. The cottage contains old woodwork and plaster-work saved from other houses and buildings in the neighbourhood during the last quarter of a century. In 1851 the author endeavoured to obtain funds to raise a monument to Newcomen, but did not succeed. It was a worthy attempt, and should be revived. Money so spent would bring back a good pecuniary return to the town, to say nothing of its moral effect.

OFFICES AND WAREHOUSES, MANCHESTER.

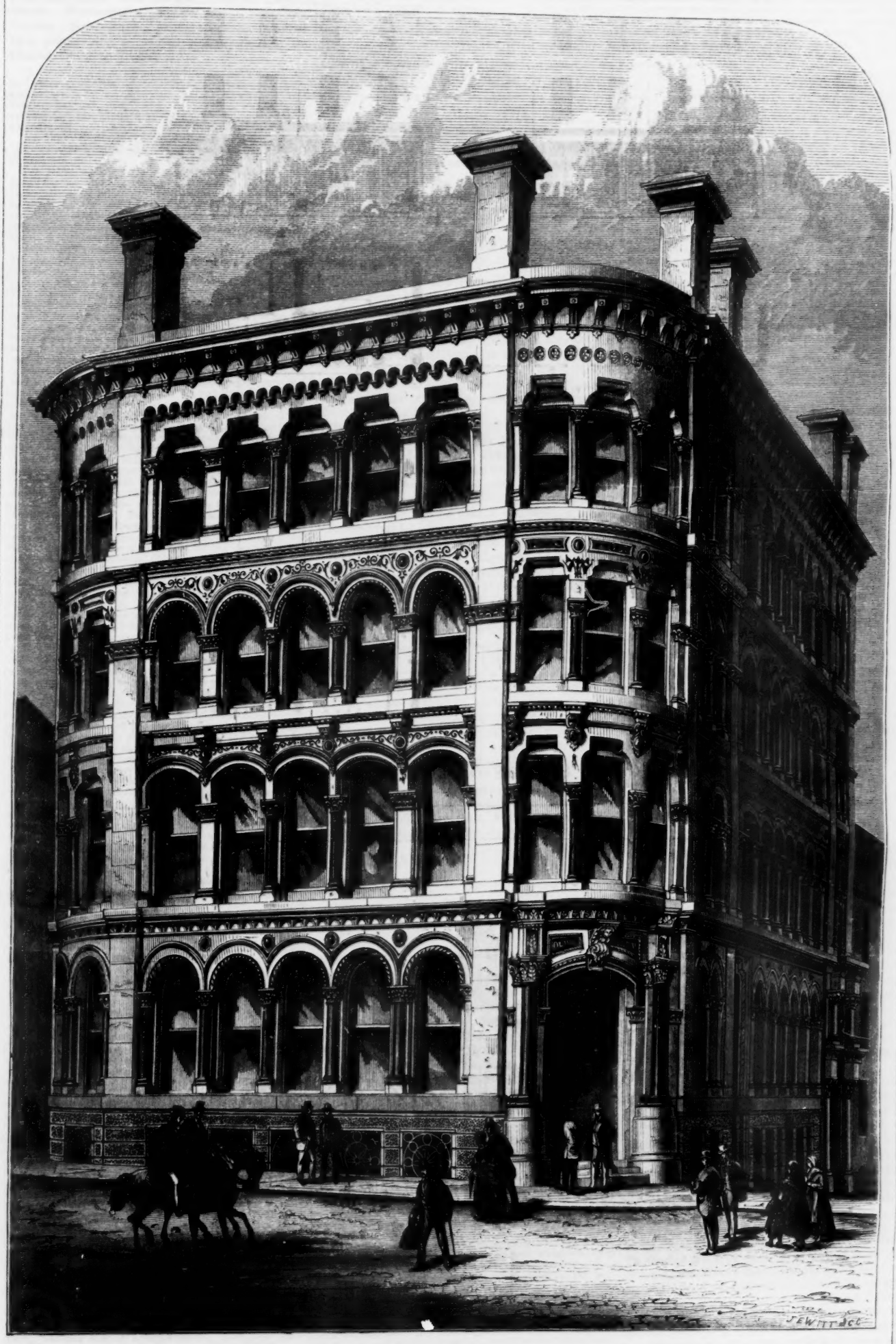
THIS building is situated at the corner of Brown and Marsden streets, and was erected for Mr. M. Olivo, of the firm of Olivo & Spartali, Greek merchants, of Manchester, from designs, and under the superintendence of Messrs. Clegg & Knowles, of Manchester. It has four stories and basement, the front part consisting of suites of offices, and the back part and basement of warehouses; the front part to Brown-street being occupied by the British Imperial Insurance Corporation. It is executed externally in Darley Dale stone, with a liberal use of red and blue granite. The contractors are Messrs. Bowden & Edwards, the carving being done by Messrs. Williams & Mooney.

* "Some Account of the Residence of the Inventor of the Steam-engine. A Note to be appended to any future History of Steam-power." Longmans, Green, & Co. 1869.

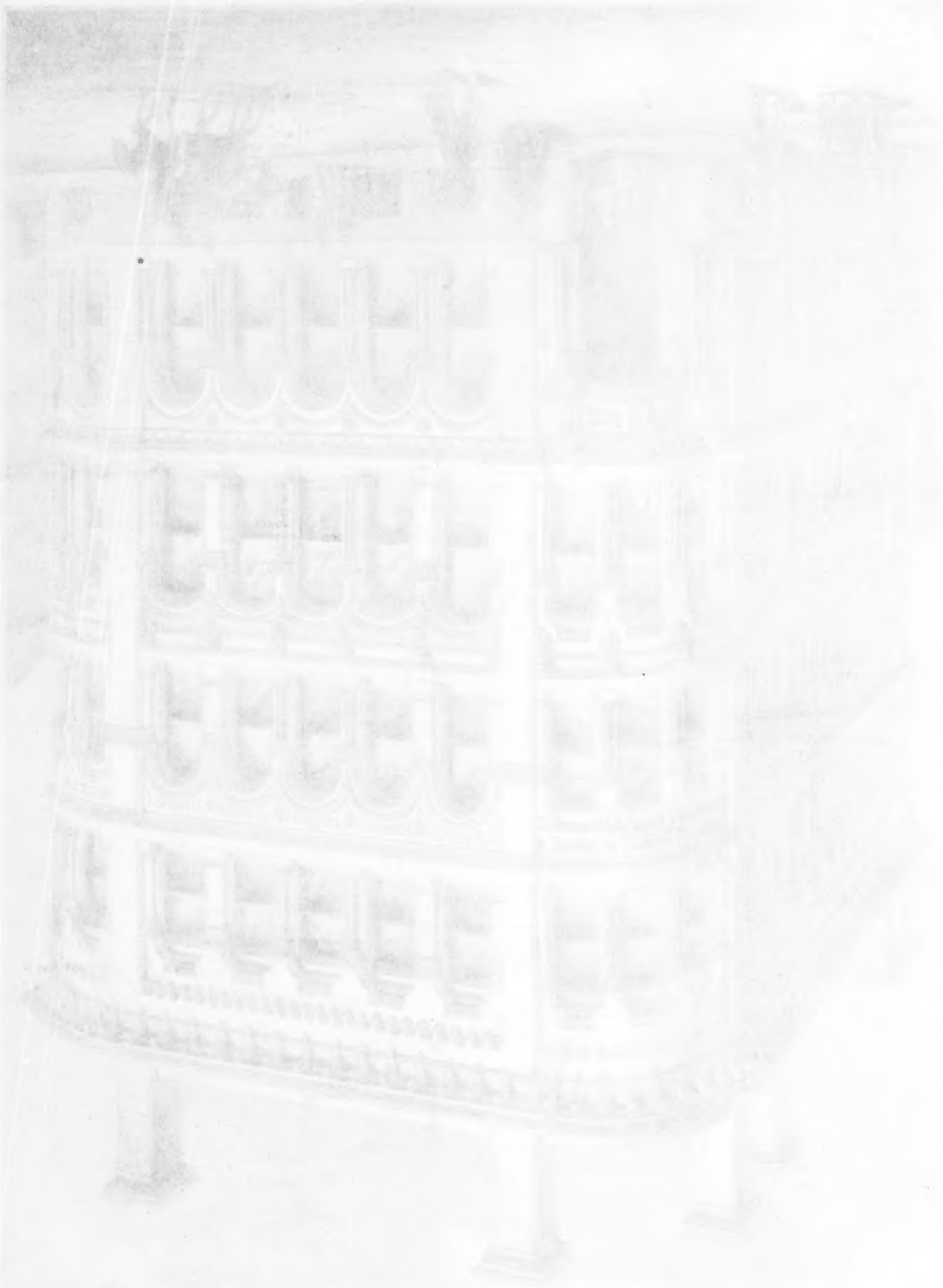


PLAN FOR WIDENING THE STREETS OF LONDON, BY MR. FREDERICK TAYLOR.

"NEWCOMIN COTTAGE," DARTMOUTH.



OFFICES AND WAREHOUSES, MANCHESTER.—MESSRS. CLEGG & KNOWLES, ARCHITECTS.



ARCHITECTS' ACTIONS.

PEACHEY *v.* GIRDLESTONE.

WE adopt the *Times'* report of this action, tried November 29th, in the Court of Queen's Bench, Westminster, before the Lord Chief Justice. Some further explanation seems necessary, particularly as to the course taken by the Church Building Society:—

This was an action by an architect against a clergyman and other gentlemen to recover compensation for plans and estimates for an intended church. The sum of 121*l.* 10*s.* was paid into court, and the question was as to the residue of the plaintiff's claim, which amounted to 442*l.* 17*s.* 6*d.*

Mr. Digby Seymour and Mr. Rew were for the plaintiff; the Solicitor-General and Mr. Macnamara were for the defendants.

The defendants were a committee appointed to raise funds for the building of a new church at Ryde, and to superintend the building. They agreed by advertisement to pay 100*l.* for designs they selected, not engaging to employ the architect who was the author of them to superintend the erection of the church. The advertisement referred the architects competing to a paper of instructions containing this clause,—"The total cost, including fittings, &c. must not exceed 8,000*l.* An estimate must accompany the designs, and a responsible contractor must be named who will undertake to complete the works for that sum." The plaintiff was a competing architect, and the committee were disposed to prefer his designs; but he failed to show by estimates that his design could be carried out for the specified sum, although he named a firm of builders as proposed contractors. The committee, therefore, only accepted his design conditionally on his satisfying them that the church could be completed for 8,000*l.* They therefore wrote to him accordingly, desiring specific calculations, and he replied, acceding to this conditional acceptance, and apologising for defective details. He met a sub-committee, and explained his designs, and, according to his statement, they suggested advertising for tenders. At all events, it was proposed, and the sub-committee resolved to throw open the building to public competition, provided it could be done for 8,000*l.*; and if that was found impracticable, they held themselves at liberty to decline the plaintiff's design. The general committee, however, did not agree to this proposed course, and overruled it. Upon this the plaintiff, nevertheless, proceeded to advertise for tenders, and to draw out detailed quantities and estimates, for which he now claimed to recover. The general committee, however, had immediately communicated their resolution to him, overruling the proposed course, and distinctly stating that they did not authorise him to take out the quantities and make the detailed estimate, although they were still willing, if he could find a builder to do the work for the specified sum, to employ him. The builders he had mentioned had said that, looking at his drawings, the work could be done for that sum; but in the result they found that they could not do so, and that it would cost 11,000*l.* The plaintiff thereupon wrote to the committee, in effect, complaining of them, and asking for further time. They answered that they were afraid of this result, and that the delay threw them into great difficulty, adding, "The advertising for tenders must be at your risk. Our means will not allow us to go further in expense." He replied, "I don't want the committee to be at the expense of advertising; but only to give me further time to obtain tenders." Thereupon the committee agreed to these terms, and while they adhered to their former terms, they were willing to allow him a little further time, and also to let him show his plans to the builders in the neighbourhood, in the hope that they might be able to take the work. In this way some further expense was incurred, and this formed another item of his present claim. Thirteen tenders were then received from different builders, and one of them was for 8,800*l.* The committee thereupon adopted his tender, on condition of his getting two sureties (whom he accordingly obtained), and the plaintiff's design was then accepted. It was admitted that he then became entitled to the 100*l.*, which was therefore paid into court. The committee, however, had intended that the successful architect should superintend the work, although, as they contended, they had not bound themselves to do so, and it was only on condition that the plans should be approved by the Incorporated Church Building Society; and this was the great question in the cause. The plaintiff was silent about it in his examination in chief, but in cross-examination he was pressed as to whether he was not told that his employment was to depend upon his plans being approved by the Church Building Society; and, though he said he "could not remember it," he did not venture to deny it, and, on the other hand, there was the most positive evidence of it. Two gentlemen (Mr. Girdlestone one of them) distinctly swore to it. It appeared probable from the admitted facts that a grant was expected from the society, and that its approval of plans is always a condition. Moreover, the plans were to be laid before the Board, and submitted to their architects, and these gentlemen distinctly stated that the plaintiff was told of this. However, the society disapproved the designs, and the plaintiff was told of this, and that no contract could be signed until the designs were so altered as to be approved by the society. The committee applied to the society to point out their objections to the design and the details, and they replied that it was difficult to do so, as they were disapproved *in toto*, and Mr. Brandon, their architect, being now examined as a witness, so stated to-day. Thereupon the committee proposed to settle with the plaintiff, paying him his 100*l.* This he declined, but proposed to send in new designs and plans in a month, and then, if they were not approved, he proposed to have another month to send in new designs. They declined that counter proposal, and hence the present action, in which the plaintiff claimed not only the 100*l.*, but all his expenses, and all the commission for taking out quantities and making detailed estimates, and also compensation for loss of his commision on the work. He calculated that if the work had been superintended by him he would have got 5 per cent. on the 8,000*l.*—that is, 400*l.*—deducting, however, in that event the 100*l.* for the designs. He, however, claimed only 3 per cent., as the matter had fallen through. But he charged his expenses in addition; not only the expenses of his journey (which were likewise paid), but the cost of advertisements. The total claim was 564*l.*, out of which 126*l.* 10*s.* was paid into court.

The case lasted two days. At the close,

The Lord Chief Justice summed up the case to the jury at some length, and with manifest care. The great point in the case, he said, was, whether the employment of the plaintiff was to be subject to the approval of his plans by the Incorporated Church Building Society. The evidence of it, he observed, was distinct and decisive, and it was not denied by the plaintiff. It appeared, moreover, he added, probable, as a grant was expected from the society, and their approval of the plans would be a condition, and if this condition was originally imposed upon the plaintiff, there was no hardship in enforcing it. The Church Society were not bound to grant money unless they were satisfied; and the committee were obliged to submit to their resolution. And if they imposed the condition on the plaintiff, he could not complain of it. The vital question in the case upon which it must turn was, whether that condition was imposed upon him. If it were so, then came the question whether an opportunity should have been allowed to him of altering his plans. The committee did the best they could for him, and applied to the society to point out their objections to the design. The reply was, that it was not easy to do so, but that the details were wrong. At all events, they declined to adopt the plans; and the committee were not bound to allow him the time they required for furnishing new plans again and again. The great point was the original proposal.

The jury, after some consideration, retired to consider, and eventually found a verdict for the defendants.

THE BELLS AND QUARTER CHIMES OF GREAT ST. MARY'S, CAMBRIDGE.

THE tower of the church of St. Mary the Great, Cambridge,—the church appropriated to the University,—has a fine peal of twelve bells in the key of D, the weight of the tenor, or largest bell, being 30 cwt. There is also a clock, and "one other bell, which is used to give notice of congregations and exercises." This bell, it is said, was, prior to 1545, "placed in Bene't Church, which was the original church belonging to the University."

It appears that a peal of ten bells was cast and hung in the tower by Richard Phelps, of Whitechapel, London, in 1724. But the tenor bell having at length been cracked, was re-cast in 1770, by Pack and Chapman, also of Whitechapel, who at the same time added two new trebles, thus making a peal of twelve bells, which were opened by a band of "Cambridge Youths" on Christmas-eve in the same year.

The eleventh bell was subsequently re-cast by William Dobson, of Downham, Norfolk.

Robert Southey tells us, that in the year 1796, the Society of Cambridge Youths rang at this church a true and complete peal of Bob Maximus in five hours and five minutes. This consisted of 6,600 changes, and for regularity of striking and harmony throughout the peal was allowed by competent judges to be a very masterly performance. In point of time the striking was to such a nicety, that in each thousand changes the time did not vary one-sixteenth of a minute, and the compass of the last thousand was exactly equal to the first.

And here let me observe that the present members of the Society of Cambridge Youths are also said to be excellent ringers.

I now come to the clock which chimes the quarters on the 3rd, 4th, 5th, and 8th bells, —counting from the treble downward,—thus:—

First quarter	3, 4, 5, 8.
Second quarter	5, 3, 4, 8; 5, 4, 3, 5.
Third quarter	3, 5, 4, 8; 8, 4, 3, 5; 3, 4, 5, 8.
Fourth quarter	5, 3, 4, 8; 5, 4, 3, 5; 3, 5, 4, 8; 8, 4, 3, 5.

The hour being struck on the tenor, or largest bell.

These quarter chimes have been copied for some other public clocks, including the great clock of the New Palace at Westminster.

I may remark, by the way, that if you have a peal of ten, the 1st, 2nd, 3rd, and 6th bells must be used for these chimes.

Permit me now to say, that I have in my possession a paper—reprinted at Cambridge in 1838—the contents of which will, I think, be found interesting to change ringers in general. Here is a copy of it:—

"REGISTER OF A SOCIETY DENOMINATED THE CAMBRIDGE YOUTHS, ESTABLISHED ON THE 3RD OF AUGUST, 1724.

This Register is extracted (so far as the entries could be obtained) from a regular series of Books still remaining in the Company's chest. The former accounts of the Old Society, which began in the reign of QUEEN ELIZABETH, are not to be found; neither are there any memoranda of the original institution now remaining, except a few accidental occurrences in the mouldering pages of a few local Manuscripts, by which it appears the Society then consisted chiefly of the *Youthful* Members of the University.

EXPERIENCE hath indisputably demonstrated the salutary advantages derived from the practice of Ringing, whilst Harmony, by her enrapturing powers, hath been allowed to exhilarate the mind, and even to captivate the gloomy aspect of melancholy. That the theory of Ringing hath been improved by the investigations of the most learned in figures, and that the moderate practice of it hath been beneficial to the constitution, have particularly been proved in the course of the two last centuries. It may, consequently, be a surprise to many, that some account of the primeval state of this Society, with the discovery and improvements of Ringing, which is so innocent and recreative an employ, should, for so long a series of years, have escaped the attention of its several ingenious members; but be it remembered, few of our ancestors were stimulated to preserve the transactions of their own times which frequently render historical relations involved in the remotest obscurity. But now, *tempora mutantur*, every industrious friend to literature hath a propensity to record the events of his time for the instruction of posterity; in which view the following concise, yet authentic and accurate remains, which have casually escaped the wreck of time, are selected for those who may then be the supporters of this Society.

In the year 1477, the old church of St. Mary, containing six Bells, was taken down, and the first stone of the present structure, laid 16th May, 1478, and was finished in 1519; but the Tower was not completed till 1608, which was 130 years after its foundation, and a peal of eight bells was hung therein by contribution, the tenor weighing 18 hundred and a half. A diligent and long attention to this sublime art rendered those who had a sagacity in discovering and judgment in admiring its beauties, at length proficients; but so far from satiating their desires, they became more and more ambitious of higher attainments; and in the year 1724, to satisfy their enlarged ideas, a new peal of ten Bells was compleated by the ingenious Mr. Richard Phelps, who died 18th August, 1738. From this event originated a new system of laws, by which the society have since been governed; but, through the corrosive influence of time, no memorials are now extant of the original society, except the bare names of those who coincided with the laws respecting the new establishment, their records *tempus edax rerum*, have long since been consigned to oblivion. In Sept. 1769 the tenor bell being accidentally broken, a laudable plan was immediately formed and successfully put in execution by Mr. DAY and Mr. PARIS, who will be respectfully remembered by this society, not only for their indefatigable pains in procuring a new tenor of about 30 hundred weight (cast 14th Feb. 1770), but for their own contributions in a subscription which they, with great diligence raised, to purchase two additional trebles for the completion of the present melodius peal of TWELVE."

Here follow the names of 110 members and 8 "representatives." Amongst the former I find:—

	Elected.
"Charles Mason, D.D. *Fellow of Trinity College, &c.*	1725
Robert Hesketh, Esq., of *Christ College*	1726
Richard Dawes, M.A., of *Emanuel College, the celebrated critic*	1731
Samuel Roe, M.A., *Fellow of Trinity College, &c.*	1739
James Bennet, *Organist of St. Michael's Church*	1738
James Gifford, Esq., *Mayor of Cambridge* in 1737	1738
Charles Day, gent., *Surveyor of Taxes*	1750
John Paris, gent., *Bookseller*	1758
John Incarsole (although totally blind, was remarkable for his extensive knowledge in the art of ringing, and other musical professions)	1767
William Robson, *Organist of St. Neot's Church*	1768
John Bowtell, *Bookseller*	1773
Humphrey Argent, *Organ Builder*	1777
Thomas Steers, *an ingenious Mathematician*	1787
Leonard Procter, Esq., B.A., of *Trinity College*	1835 "

I should mention that the last member in the above list, Mr. Leonard Procter, is still an able performer, and—like Messrs. Cattley, Denison, Ellacombe, Troyte, and many other country gentlemen—often joins in the manly and healthy recreation of scientific change ringing.

THOMAS WALESBY.

PRE-MISES *v.* PREMISSES.

SIR,—An alteration of orthography in a familiar word is gradually creeping into use, which alteration I strongly deprecate, on the ground of its being not sensibly correct. Technically correct it may be: that point I must leave to scholars to decide; as also the question of "root" and "derivation." I can merely regard the matter from the stand-point of utility and common sense.

The alteration to which I allude is the substitution of the word "premisses" for "pre-mises." No doubt, it is absurd to employ the one word "premises" in two entirely different senses, as we now do. We say, speaking of our homestead, "on my premises;" and when referring to some prefatory proposition as to any matter under consideration, we say "judging from the premises."

Now, surely the word as it stands is more necessary in the latter case than in the former. What has been pre-mised must be the pre-mises, and to double the *s*, and make the word pre-misses, seems palpably wrong; for then it reads as if the foregoing reasoning had all been pre-misses: former failures, in fact. Why should we not retain "premises" with one *s* when used in the sense of prior statements? And, if necessary, let the word be pronounced pre-mises, to agree with the verb *to premise*; and write "premisses" when applied to an estate. To double the *s*, or even to spell the word with two *m*'s, would be a matter of small consequence, for the sound and sense would not be altered; and no particular meaning, so far as I know, attaches to the term that makes it, as now spelled, peculiarly applicable to one's house and grounds: one's premmises, in fact, or premisses, if you will.

I am aware there is a noun "premiss," a premise, or antecedent proposition; but this is

obsolete, and when I read the other day in a well-known publication "granting the truth of the premiss, the claim is a strong one," the phrase struck me as being not only awkward, but also as opposed to common sense.

I therefore, for one, vote for "pre-mises," our prior explanations; and "premmises," or "premisses," our house and grounds. R.

BROADWAY ARCADE RAILWAY, NEW YORK.

The New York papers are very much taken up with a new project, which they regard as preferable to the tunnel railways, such as our own Metropolitan, one of which it has been proposed to form in New York. The Arcade Railway would run along Broadway, the line of ordinary traffic above and the railway traffic beneath. The street would be sunk from the present level to a sufficient depth to form an arcade with groined roof of masonry supported by iron columns. The area space in front of the buildings would give light and air to the under roadway; but whether it is proposed to sink the level of that roadway lower than the foundations of the houses, or, if so, how that is to be done, does not appear to be clearly pointed out. The upper roadway would be substantially paved, and of course would need no lifting for gas, water, or other purposes, the subway providing for these. The surface water would descend through the columns. The groined roof would be made water-tight by means of asphalte. There would be footways at each side below, the same as above, and staircases to ascend and descend.

The high-level railroad projects, as well as the tunnel ones, have been cast altogether into the shade by the arcade plan. The time seems to have come when one or another of these projects must be adopted.

The New York traffic has immensely increased of late years. From the reports of the State Engineer, it appears that the number of passengers carried by horse-cars increased, within the nine years from 1859 to 1868, from 43 to 1 to 104 to 1; and it is now estimated at 115 to 1 by the city railroads alone; the number of passengers carried being set down at 118,000,000, by contrast with 32,889,030 in 1859.

GRANITE COLUMNS.

Sir,—I hope you will pardon my troubling you with a few observations in reference to your correspondent's remarks on this matter in your last impression. I am an old mason, and have carried out many heavy and important works, and cannot agree with him, that "most of the granite columns that are brought to London have a hole drilled through them from end to end." I beg to say that in all my practice I am not aware of such being the case, excepting where provision for gas-pipes is necessary; but all columns, caps, and bases, as well as heavy pilasters, have "Lewis-holes" in top of them, for the purpose of hoisting and fixing, which holes do not generally exceed 8 in. or 10 in. deep. Neither do I quite agree with your correspondent as regards the beds being "perfectly smooth." Most assuredly they should be perfectly straight and closely axed. In fixing sheet-lead between the joints, it should not be less than 9 in. or 10 in. wide, and not within 1½ in. of the outer edge of the column, and of not less substance than six pounds weight to the superficial foot. J. S.

DOES IRRIGATION PAY?

The area of land under irrigation in the north-west provinces of India during the Rubbee season of last year was as follows:—

	1869-9.	
Ganges Canal	797,319	acres.
Eastern Jumna Canal	203,692	,,
Dooab Canals	10,494	,,
Bareilly and Terace Canals	37,890	,,
Total	1,049,295	,,

The importance of these works is strikingly exemplified in these figures, which are given by the *Indian Economist*, which concludes that but for these canals 1,050,000 acres of land under cultivation would have been barren through drought. Now an acre of irrigated land in the north-west, continues our authority, will produce from 1,200 to 1,900 lb. wheat, or the whole area irrigated an abundant supply of food for 3,000,000 persons for a whole year. The average price of wheat, moreover, throughout the provinces for some weeks past had been about 10 seers the rupee. Thus the irrigation of this million of acres has resulted in a crop of food of the money value of 8,000,000*l.* sterling:—

Acres. lb. wheat. lb.
1,050,000 × 1,500 × 20 per rupee = Rs. 78,750,000

Now here, he adds, is a very simple sum in arithmetic, and yet how slow we all are to learn it. The total cost of the whole Gangetic system of irrigation has been, if we remember rightly, about 2,000,000*l.* sterling, and here it is recouped four times over in a single season of drought. In addition to this million of acres under irrigation for the rubbee crop, there were 326,114 acres irrigated for the khureef harvest, a total area of 1,375,409 acres for the two crops. What proportion of this land would have been absolutely barren but for the canal works, we are not told. Let the State but retain its interest in the land, concludes the *Economist*, and the time will come when we may obtain 50,000,000*l.* a year from it, with as much ease as we now do 20,000,000*l.*,—a very *arithmetical* sort of fact, which a troop of Indian statesmen find it impossible to master.

THE SANITARY CONDITION OF GOOD HOUSES.

Sir,—No apology is required for addressing the *Builder* on the question of sanitary improvement. You have so long been a general in the fight that I doubt not you will allow one of the rank and file, a full private, to fire a shot in the cause.

Beginning where things were at the worst, your labours were directed to the amelioration of the condition of the poor in the dark and confined alleys of this great metropolis; and for whatever improvement has been effected, you may fairly take a large share of credit.

I want you to help now to stir up an agitation in favour of a higher class, namely, the occupants of the terraces, places, and villas of the suburbs. So far as the sanitary condition of their dwellings is concerned, this class is at the mercy of the builder and landlord. Feeling strongly on the subject, I will not risk drawing on my imagination, but will describe the state of things actually existing in the house I occupy,—a house built within the last five years, and finished with all the "latest improvements."

Finding that there were unmistakable "sewer smells," both upstairs and down, I made a thorough examination, and discovered, to begin with, that the drain ran right under the house from front to back, and that not even ordinary precautions had been taken to make the pipe-joints tight. The waste-pipe to the sinkstone in the scullery was (supposed to be) protected at the top by an ordinary bell-trap, and its discharging end was passed just through the flags and delivered into an open 9-in. brick shaft, built above a square junction on the drain-pipe. To allow the gas to spread under all the basement floors, half bricks were left out of the sleeper walls and partitions at certain intervals. Two pipes ahead of the sink-stone branch, another junction received the overflow from the scullery cistern, the pipe being carried up without even an ordinary syphon bend. Together, these neat little arrangements fully accounted for the smells in the basement. On the ground floor, there is a water-closet; above it, on the first, a bath-room; and above that again, a cistern supplying both with water. The bath waste and overflow, and the cistern overflow, were connected with the head of the soil-pipe behind the closet trap. Here, then, was another direct flue ventilating the sewers into my bath-room, and accounting for the sickening odour there experienced. I had these things set right by taking all the waste and overflow pipes into a trap *outside* the house, so arranged as to cut off all connexion between the inside and the drains. The man whom my landlord sent to do the work assured me that many of the houses in the neighbourhood were similarly drained, as he himself had had the doing of them; and from further inquiry, I am satisfied that not only is this *not* an exceptional case, but an example of an almost universal rule. Could anything possibly be devised better calculated to bring our houses into the condition of the notorious infirmary wards of the St. Pancras workhouse?

With a cistern overflow on the same floor, in direct communication with the sewer, the air breathed in sleeping-chambers must of necessity become highly polluted during the night, and to this may doubtless be attributed hundreds of cases of illness, preventible under better sanitary conditions. During the winter months, when every occupied sitting-room has its fire, and all means of ingress for external air are closed, a sort of exhausting action takes place, and the foul gas from under the basement floor and ill-devised connexions, is sucked up and passed through the rooms and the lungs of their occupants, to supply the place of the air ascending the chimneys. This is no fancy, but an unpleasant experience I have myself enjoyed.

Surely such a state of things only requires to be understood for householders to take steps to remedy it. It is of no use to trust to the respectability or position of your landlord. The class of houses I refer to are erected by speculating builders, whose only care is that the cost shall be kept down, and that the houses shall have an attractive appearance. Such unimportant details as drains are left to the tender mercies of some old navvy, who takes them to do by the piece, and the connexions to a plumber, whose faith is built on a bell-trap. If cistern overflows are ostensibly protected by the orthodox syphon bend, it is a delusion, because the waterworks companies have the power to inflict a fine in case the ball-cock is so "set" that the water runs away by the overflow at the time it is coming in by the service, that though the syphon is there, the water is absent, and no trap is made. What is imperatively wanted, sir, is an amendment of our building byelaws, by which district surveyors shall have power to enforce the execution of house-drainage works in accordance with sound principles.

In these days of sanitary commissions and social science congresses, it is a disgrace that the dwellings of the middle and higher classes of London, should be the breeding-places of fever; and it is high time that all medical officers and inspectors of nuisances should deserve, by their exhibition of zeal, the epithet "Sanitary Mad," bestowed by a wise member of the St. Pancras Vestry on one of their officials.

J. M.

SANITARY CONDITION OF GLASGOW AND BRISTOL.

Last week a deputation from the Sanitary Committee of Glasgow, with Dr. M'Gill, one of their medical officers, and Mr. Ellison, their inspector of cleansing, visited Bristol, and had an interview with the committee of the Board of Health of that city, with a view to learn the sanitary arrangements adopted in Bristol. At three p.m. the high sheriff, Alderman Proctor, entertained the deputation, the Mayor of Bristol, and the committee of the Board of Health, at a sumptuous luncheon at the Royal Hotel, when sentiments of reciprocal respect and good wishes were exchanged between the members and officers of the two sanitary committees. The Lord Provost of Glasgow intended to be one of the deputation, but was prevented by an engagement in London in connexion with the visit of the King of the Belgians. The deputation during their stay visited several of the poorest localities in the city, and expressed themselves highly pleased with the sanitary arrangements of the Board of Health. Such exchange of opinions and amenities between different sanitary authorities must result in the improved health of our large cities, and it is highly desirable that such practical authorities should "compare notes" more frequently. It is to be hoped that the deputation will make public the result of their observations.

TELEGRAPH SYMBOLS.

The advantages of a system of telegraphy, have been widely advocated by the Press. Publicity and mutilation of telegrams and telegraphic matter are two evils in the present system, which, it seems strange, have never yet been abolished by the use of a regular cypher or secret code for the transmission of messages. Recently, however, the Postmaster-General decided in sanctioning for the use of the public a numerical telegraph code. This is Major Bolton's code, which did good service during the campaign in Abyssinia, and is now in use by the military and naval services. The system of the code consists in an alphabetical list of sentences numbered, as is likewise the page upon which they stand. The entire of our language has been, it is asserted, collected together in this way, so that a person is able to code an ordinary message of twenty words into a couple of Bolton groups, or ten figures.

There is also a spelling code, for rendering proper names and uncommon words, and an arrangement of symbols to express decimals, fractions, stops, &c. The code book is a key or dictionary of a language. The pages are numbered in consecutive order, and also the lines of each page, and when it is desired to send a message, all that is necessary is to transmit the number or numbers, referring to the page and line in the code where is to be found the letter, word, or sentence which the correspondent is to be acquainted with.

THE MATERIAL FOR MEMORIAL TABLETS.

I HAVE recently been trying various experiments in the construction of tablets of a permanent, indestructible, and, so far as practicable, an ornamental character, for street nomenclature and other purposes. I may briefly mention that among other methods which I have tried, the most durable and useful seems to me to be that of stamping letters out of silicate of iron and pressing them upon zinc plates, which upon exposure to the air become perfectly united and extremely hard. For better preservation (although not essentially necessary) from the mirkiness of the London atmosphere, I encase the whole in a zinc case prefaced with common glass, which renders them air-tight, water-tight, and anti-corrosive; and, as regards legibility, equal to any tablets for the purpose yet brought under public notice, and at a considerably reduced cost.

It may be urged that the liability of glass exposed in a public thoroughfare to breakage would form the chief objection in the construction of street tablets, but the same objection might be raised with regard to the construction of street lanterns, &c., irrespective of the penalty attaching to the wilful destruction.

In appearance these tablets resemble, as nearly as possible, the enamelled iron tablets now in use, which, owing to the contraction and expansion of the iron by the fluctuation of heat and cold, the exposure to damp (more especially fog), together with the costliness of their construction, are to some extent objectionable.

I have ventured to address you on this subject presuming that it may, perhaps, afford some information, or be made in some way applicable to the purposes of memorial tablets.

W. S. BRAINE.

LIVERPOOL ARCHITECTURAL SOCIETY.

AT the last meeting of this society, December 1st, Mr. W. H. Picton called special attention to the fact that the publication of the Dictionary of Architecture, which had been partially in abeyance for some time, was being resumed, and it was expected that it would be carried on with more rapidity than formerly. The promoters of the Dictionary were desirous to receive the support, in the way of subscriptions, of all who were interested in the art which it was to illustrate. Mr. C. H. Beloe read a paper, illustrated by diagrams, descriptive of the new works of the Rhyl District Water Company, now in progress, and in which some peculiar difficulties had to be encountered, owing to the geological formation of the site, and the heavy gradients on which some of the pipe lines had to be laid.

FIRE!

SIR,—Without wishing to find fault with any particular person, I beg to ask whether it really is not time that some serious inquiries should be made as to the most expeditious and best mode of extinguishing fires in the metropolis. I happened to be at a fire that took place in the Brompton-road within this week, when two large shops thrown into one, with four stories above each shop, and the large stock of a linendraper, were consumed. I was not there till after the shops were fully on fire, yet for quite half an hour after there was no other but a hand-power engine. The Life Guards were there, but they either would not or could not get into play. However, when the whole of the ground and first floors were in full blaze, other engines arrived, and the system seemed to be to try and extinguish the fire at the lowest part, instead of playing upon the highest part, when the lower part would then receive the surplus water. As it was, the houses were seen to burn upwards, story by story, till the roofs fell in, and burnt themselves out. Surely some reasonable men could meet and settle rules to guide the firemen in extinguishing fires, instead of increasing them by draughts below.

The course pursued on the night in question was certainly not the way to tackle such a terrific enemy. S.

FOREIGN JOINERS' WORK FOR ENGLAND.

SIR,—I notice a memorandum in your last, to the effect that some of the joinery for St. Thomas's Hospital was made in Sweden. Will you allow me to add that I have also executed a large order for windows for the same building.

Touching the concluding paragraph (that the Swedish work is cheaper than work made at home), I would observe that I have just received orders for a second and larger quantity of windows, and that for this order the Swedish firm referred to estimated against me, and lost it.

W. H. LASCELLES.

A NAME FOR THE STREET BY THE MANSION-HOUSE.

A CORRESPONDENT, "W. H.," writes:—

I have seen it mentioned that the authorities are in want of a fitting name for the new street leading to the Mansion-house. I am, I confess, surprised at there being any doubt whatsoever as to what the name should be.

In all London there is not a street that I know of—I am certain no street of importance—named after the greatest name in all literature. "Shakspeare Walk" was named after a Mr. S. of the last century—not after the immortal bard. The new street must pass quite close to the house in St. Anne's, Blackfriars, which occupies the site of the house which belonged to Shakspeare's own self. Are not the contracts connected therewith in the City Museum? Could you not advocate the appellation? Some years ago I made a pilgrimage to the court in which the house stands. A boy, seeming to understand what must necessarily be the object of my search, pointed to a house, saying, "That is *the* house, sir."

TECHNICAL EDUCATION.

SIR,—With reference to the subject of technical education, the meeting held at the Royal School of Mines, Jermyn-street, some time ago, was called a failure, I must admit; but there is no effect without a cause. Had there been a lecture by any of the doctors or professors on any scientific subject, it is a proved fact that the theatre would have been crowded, and many sent away that it would have been impossible to admit. I think that the meeting was called for the purpose of inducing persons to become members of working-men's clubs, at 2*s.* 6*d.* each, irrespective of character or calling. Circumstances prove that the working classes are settling to more solid work, as the attendance at the lectures last winter at the Royal School of Mines shows that where there is anything good to be heard, where there is any real knowledge to be obtained, at any time when the working classes have leisure, there you will find them. But "Reasoner" must not look to the employers of labour in this country to promote the cause of technical education. It is not to their interest to do so. If the capitalists, the wealthy consumers, do not look to their own interest, and join with the workers who produce the articles they require, they must bear the consequence; they must be prepared to admit into their associations, to expect the friendly greeting in Rotten Row of some persons whom, only a few years back, they looked upon as their menials. That is the case at the present day. Employers and others have acquired their wealth at the expense of the capitalists and the workmen alike. "Reasoner" shows truly that good workmen are frequently discharged, and spoilers of materials kept on. Who pay for that? The employers. But who pays the employers? The capitalists, to be sure. So, therefore, you will see the necessity of the capitalist acquiring a good technical education; it will therefore be obvious who will be parties benefited by a good system of technical education, the capitalist and the real producer, or workman.

ALEX. KAY.

BRITON'S FARM UNDERDRAINAGE, HORNCHURCH, ROMFORD, ESSEX.

SIR,—For the above, tenders were invited for the construction of the same, for which twelve estimates were submitted, varying from 630*l.* to 290*l.*, the "engineer's" being 350*l.*, and No. 9 in the list of estimates being also 350*l.*, who submitted a second estimate, which came between Nos. 11 and 12 estimates, and has been accepted. Now, I ask, if fair play has been exercised after the trouble and expense taken by contractors, why should No. 10, like those below, being responsible and competent persons to have carried out the works, have been set aside, otherwise than through partiality. Your giving publicity to the above will greatly oblige A COMPETITOR.

ANOTHER SITE FOR THE GREAT LONDON FISH MARKET.

SIR,—The very best site for a new general fish-market would be the water part of St. Katharine's Docks. All sites which are not upon the river side are objectionable for the purpose; as, though 60 per cent. in weight of our fish now come to London by railway, it is certain that in a few years' time, when improvements are carried out in ships so as to increase their speed to perhaps thirty or even fifty miles an hour, nearly all the fish will come again by water as it did twenty years ago. The up-river docks cannot stand against the down-river docks; and while the *buildings* of St. Katharine's Docks might still be used as bonded warehouses, the water part of the St. Katharine's Docks might with advantage to the amalgamated dock companies be sold, and on it a grand market built. It would be close to the projected Tower Bridge, and so would be very convenient for the dwellers in south London; it would be close to the Blackwall branch of the Great Eastern Railway, by which a deal of fish comes; and it would be close to the Tower-hill station of the Underground Railway. Any man who takes a map (and without a map it is impossible to understand the matter), and looks at it with an unprejudiced eye, must see that this is of all others the best spot for the great London Fish-market. Nightingale-lane should be done away with, and thrown into the dock property; and a road should be made right across the proposed site, commencing in Lower East Smithfield, just west of Burr-street, and coming out in Upper East Smithfield, somewhere about what is now the principal entrance (not the office entrance) of St. Katherine's Docks. F. D. W.

MIRRORS IN ARCHITECTURE.

I WAS not aware, until I read the letter of Mr. F. R. Wilson, in your impression of the 27th, that mirrors had ever been used as a decoration in a Mediæval church. As there is a precedent for such a mode of decoration, it may not be out of place in me to state that I have long entertained the idea that *small* mirrors might be so used. In the finial of a spire, for example, they might be made to play a brilliant part, as, when the sun's rays struck upon them, they would glitter like gems. Suppose the finial to take the form of a cross, I would insert a mirror of about 6 in. in diameter at the intersection, and one of about 3 in. diameter at the extremities of the three upper limbs. They would require to be framed in the metal, and secured against rain penetrating to the back, and washing off the quicksilver. W. G. S.

DOBROYD CASTLE.

SIR,—With reference to the roof of Dobroyd Castle, we beg to state that the whole of the building has been covered by us in thick Vieille Montagne zinc. The zinc-work to sunlights was also executed by us.

J. W. TYLER & Co.

*** Mr. James Davis, of Malvern Wells, also writes to "regret that he is not noticed as the builder." His name appears in the lines we printed. Mr. John Underwood wishes it to be known that he executed the carving and modelling.

RAILWAY MATTERS.

THE Metropolitan Railway Company have at length decided upon running workmen's trains at more convenient hours, and with extended privileges to the holders of the tickets. This will be felt as a great boon by those who are compelled to reside in the suburbs. It is also intended to reduce the fares between some of the stations on the Brompton and Westminster line.

The first ten locomotives ever built in Russia have just been completed at the works of Herrn von Struve, at Kolomna, near Moscow. It is said that no pecuniary assistance on the part of the Government was required by these gentlemen for this purpose.

It is estimated that by the end of the year 1869 there will be laid in the United States, in round numbers, 110,000 tons of steel rails, equal to 1,100 miles of steel road; and of this amount about 36,000 tons (equal to 360 miles) will be laid during the present season. These rails are in use on more than fifty different roads, and are partly of American, principally of English, and to a small extent, of Prussian, manufacture.

MONUMENTAL.

Bust of Lord Palmerston for Harrow.—A massive pedestal of Cornish serpentine has just been placed in the library at Harrow; and on it will be placed a bust of the late Lord Palmerston. The stone is from the quarries of Lord Falmouth, near the Lizard. It is of a dark ground, with bright red figure, and contrasts with the white statuary marble of the bust. On the front of the pedestal is the word "Palmerston" in large gilt letters, and on the opposite side, "Presented by W. Grant, 1869." The pedestal was manufactured by Mr. John Murphy, of the Penzance Serpentine works. This is the third pedestal of the same material which Mr. Murphy has made for the same place.

Torquay.—An elaborate canopy in wrought iron has been completed for the tomb of the Rendle family in the Stoke Gabriel Church of Torquay, by Messrs. Barnard, Bishop, & Barnards.

A Poet's Monument at Leek.—A memorial cross will shortly be erected in Horton churchyard to the memory of George Heath, poet, by the subscriptions of his friends. It has been designed by his friend, H. Wilson Foster, of Kensington, and is in course of execution by Mr. Barlow, sculptor. It is a shaft, 9 ft. 8 in. high, on a plinth of one block, surmounted by an ornate cross, 3 ft. wide and 16 in. thick, in the centre of which is the sacred monogram, surrounded by a wreath of bay-leaves in relief. Up the shaft runs a sunken panel, containing the inscription, in old English, with red capitals. The front of the column and the three wings of the cross are ornamented with carved arabesques in relief. It will be executed in the hardest Kerridge stone, polished. The inscription is as

follows, the lines being a quotation from one of the deceased's poems :—

"Erected in memory of Geo. Heath, of Gratton, who, with few aids, developed in these Moorlands poetic powers of great promise, but who, stricken by consumption, after five years' suffering, fell a victim to that disease May 5th, 1869, aged 25 years.

His life is a fragment, a broken clue—
His harp had a musical string or two;
The tension was great, and it sprang and flew,
And a few brief strains—a scatter'd few—
Are all that remain to mortal view,
Of the marvellous song the young man knew."

Monument to King William I. of Holland.—A national monument in honour of William of Orange, first King of the Netherlands, has long been in course of erection at the Hague, and has now been inaugurated by the King and Queen of Holland, in the presence of the diplomatic corps, a large gathering of the nobility of the country, and an immense concourse of spectators. Two flights of stone steps lead up to an extensive basement area, on which is erected a pedestal supporting a statue of King William I. and some allegorical figures. The sides of the pedestals are adorned with relievos of the most important events in the king's life, and amongst them is one of the landing, while he was Prince of Orange, at Scheveningen, from her Majesty's ship *Warrior*, on the 31st March, 1813, after an exile of nineteen years. An officer of this ship, Vice-Admiral Sir William H. Hall, K.C.B., who was a midshipman at the time of the prince's return, was specially invited to be present at the inauguration ceremony, and he was accompanied by the Hon. Lady Hall, who, it happens, is the daughter of the captain who commanded the *Warrior* when she performed this service;—viz., the Hon. George Byng, the sixth Viscount Torrington.

COMPETITIONS.

Clapton, N.—A limited competition for the new Christ Church, at Clapton, has just taken place, Messrs. Brooks, Dolman, Truefitt, Wigginton & Morris, and Tanner & Stone, being the competing architects. After several meetings, the building committee selected the design "Sine Dubio," by Messrs. Wigginton & Morris, who will carry out the works.

Printers' Almshouses.—At an adjourned meeting of the council of the "Printers' Almshouse Pension Corporation," held on Tuesday last, for the purpose of appointing an architect for the additional wings to almshouses at Wood-green, the design of Mr. Charles Bell, of Craven-street, Charing-cross, was selected out of the five designs sent in competition; and under his superintendence, the work will be proceeded with forthwith.

CHURCH-BUILDING NEWS.

Bilston.—St. Leonard's Church has been reopened for divine service. The work of improvement has been confined as yet to the rearrangement of the former chancel, and a portion of the nave immediately adjoining, for the purpose of completing the requirements, which the insufficient space originally provided had hitherto rendered impracticable. The original chancel (of about 11 ft. in depth) has been extended westward about 10 ft. into the nave, where its line of limit is marked all round by a stone step; thus raising the new portion of the "chancel" (as it may be termed), upon a platform to that height above the general level of the floor of the church. Upon this platform are arranged the new choir seats, which face north and south on each side of the central passage; and on the south side is placed the prayer-desk; while against the northern corner of the chancel arch stands a new pulpit, erected as a memorial of the late Bishop Lonsdale. The altar-rail is also new—partly of oak and partly of metal; and from it rise two ornamental gas standards, with branch lights, which serve to light the chancel. Other gas-standards are fixed in convenient positions, to serve for the choir seats generally. Iron scroll-work is introduced into the open fronts of the book-desks on each side of the central passage. On the several floors there is an intermixture of pattern-tiles with red and plain ones, and with the occasional introduction of glazed tiles, and black glazed strips, ranged in zigzags, and lighted up by white squares at the angles, as within the altar-rail. The work generally has been carried out from the designs and under the superintendence of Mr. J. D. Wyatt, of London, architect. Messrs. G. & F. Higham, of Wolverhampton, were the contractors. The tiles for the paving were procured from Mr. W. Godwin, of Lugwardine; the metalwork from Skidmore's Art Manufactures Company, Coventry; and the stone carving was done by Mr. Earp, of London. The total cost of the alterations amounts to 275*l.*

Sutton.—The church here has been re-opened by the bishop of the diocese. The edifice has been renovated. The west gallery has been removed, and the tower-arch opened, and the whole area of the building is seated with open benches. A stone pulpit, with the panels filled with alabaster carved figures, stands at the entrance to the chancel. Choir-seats and organ are placed in the chancel. The altar, which is 8 ft. 6 in. long, has a green frontal, embroidered.

Strood.—The new church of St. Mary has been consecrated by the Bishop of Rochester. The building is in the Early English style, with nave, chancel, and side aisles, the entire length being 98 ft. and the width 48 ft., with a tower and spire at the west end. The architect was Mr. Arthur W. Blomfield, and the contractors were Messrs. Foord & Sons. The church is built of Kentish rag, with freestone dressings. The entire cost of the church, with the sum appropriated for the endowment, was about 10,000*l.* Accommodation is provided for 500.

Pedmore.—The church of Pedmore, a small parish adjoining Stourbridge, has long stood in need of restoration, and of late had become so dilapidated that a few weeks ago the greater part of it was taken down, for the purpose of rebuilding. The structure contained some Norman work in the chancel arch, south doorway, and other portions; Early English in the chancel, and the rest fifteenth century. On the tympanum of the door is a crowned figure in the act of benediction, supposed to be the Deity, or the Saviour, surrounded by the *vesica piscis* and symbols of the four Evangelists. Others have thought that the central figure was meant either for a bishop or king of Mercia, as it is difficult to say whether the headcovering is an ecclesiastical or regal device. This curious relic of Norman work is to be preserved in the renovated building, as will also be the chancel arch and tower. According to estimate, the cost of the rebuilding will be about 3,000*l.*, and one-half of this amount has been granted by the feoffees of Oldswinford Hospital, who are the patrons of the living and owners of the manor. The sum of 1,200*l.* has also been raised by subscription, so that there are only 300*l.* deficient at present.

Great Yarmouth.—The south-west pinnacle of the great church of St. Nicholas has been completed. From want of sufficient funds, the restoration committee has been compelled, reluctantly, to postpone the completion of the angle-tower, which, rising in a straight line of 70 ft. from the ground, forms a feature in the design, both of the south aisle, now under restoration, and also of the west front of the church. The ladies of Yarmouth determined to raise the sum of 200*l.*, in order to complete the tower. Contributions rapidly flowed in from eighty donors and collectors. A small balance remains in hand, and further donations will be applied towards the restoration of the second of the four pinnacles of the west front. At the point where the work thus carried out by the ladies' fund was commenced, it is proposed to insert the following inscription :—"To the glory of God. This south-west tower was restored by the ladies of Great Yarmouth. 1869."

Books Received.

Memoir of the late Henry Booth, of the Liverpool and Manchester, and afterwards of the London and North-Western Railway. By Robert Smiles. London: Printed for private circulation by Wyman & Sons, 75, Great Queen-street, Lincoln's-Inn-Fields.

This is an interesting memoir of one of those far-seeing, long-headed men, to whom, after the inventors and maturers of the locomotive, the world is indebted for one of its most wonderful agents of progress,—the railway. Without the support of enlightened men of business and capital, what could even a Stephenson have done towards the establishment of the railway system? Mr. Booth was a leading man in the locomotive trial on the Manchester and Liverpool Railway, and in the promotion of that line generally; the result being the establishment of the modern railway system. His long and useful public life was mainly devoted to the promotion of railway interests, and his name was well known to the public in that connexion. He was born in Liverpool in 1788, and was the eldest son of a well-to-do corn-merchant of that town. He only died in March last, so that he lived to the goodly age of 81. The contents of the volume under notice first appeared in a series of articles, by Mr. Robert Smiles, in the *Railway News*, and have now been reprinted for private circulation.

Vegetable Physiology; in a Series of Easy Lessons. By Edwin Lankester, M.D., F.R.S. London: Cassell, Petter, & Galpin.

This little treatise was written as part of a series of lessons for reading in schools; and although it does not appear to have been newly written, the preface shows that it has been revised by Dr. Lankester, and printed separately from treatises by other authors along with which it first appeared in print. It is illustrated with diagrams, and forms an instructive and interesting outline of vegetable physiology. The rising generation owe much to Dr. Lankester.

Pictorial Scenes from Pilgrim's Progress. Drawn by Claude Reignier Conder. London: Hodder & Stoughton, 1869.

The immortal tinker of Bedford never dreamed, great dreamer as he was, that men would go on, generation after generation, setting forth his work and seeking to illustrate it by pencil, brush, and graver. So, however, it is; and so with little doubt it will long continue to be. The last illustrator,—at least, he was so yesterday,—Mr. Claude Conder, gives a series of pictorial dreams, with imaginative backgrounds, in chromolithography, in a manner founded on that of M. Doré. The first, "Yonder Shining Light," is immeasurably the best of the series, and raises hopes which are scarcely fulfilled by some of the others. Our second favourite is "Out of the Wilderness," with its suggestive expanse of wood and high horizon. They show much poetic feeling.

VARIORUM.

"Twickenham Drainage: Report on a proposed System. By H. M. Ramsay, Surveyor to the Local Board." By the system here proposed, the sewage of the parish of Twickenham would be collected to a point of outfall on land near to Marsh Farm, and would be available whether under a system for irrigation, filtration, or deodorisation. The surveyor proposes the separation of the rainfall from the sewage. If deodorisation should be resolved upon, the milk of lime process is what he advises; and pumping power and settling tanks are provided for. The outfall sewer, according to the plan, is so arranged or laid down as to levels, that it could be extended to any other point deemed desirable for working on the irrigation system, and without any alteration in branch or other sewers. The report is accompanied by a key plan of the proposed scheme.——"Transactions of the Institution of Engineers in Scotland: 13th Session, 1869-70." This portion of these Transactions contains papers on the Denburn Valley Railway; by Mr. G. S. Hird, C.E.; and on some Improvements in the Scantlings of Iron Steam-vessels; by Mr. John Price; besides the report of the Council; introductory remarks by the President, Professor Rankine, C.E.; and a number of plates, illustrative of the papers read. —— "Statistics of Invention; illustrating the Policy of a Patent Law. Part II. of a Letter addressed to the Right Hon. Lord Stanley, M.P. By Henry Dircks, C.E., &c. London: Spon." Mr. Dircks here ably advocates the cause of the inventors, and attacks those who wish to pick their pockets of the fruits of their brain-work. ——"How to make Money by Patents. By Charles Barlow. London: Barlow & Clare, Office for Patents, Chancery-lane." Although this pamphlet is liable to be regarded as a trade book, promotive of the business of a patent agent, still it contains much wholesome advice to inventors and would-be patentees; and shows how valuable and lucrative many inventions have been to the patentees and inventors; and how best to proceed in order to secure similar results even under our very defective and obstructive, but improvable patent law.—— "The People's Guide to the new Law of Bankruptcy, &c., written in plain English. Houlston & Wright, Paternoster-row." This is a timely and useful, as well as a cheap guide. It behoves all who are liable to pecuniary difficulties, and some among them who have knavish desires to cheat their creditors, to know how

the new law may affect them; for it is in some respects very different from the old. For fourpence sterling they can now ascertain this from Houlston & Wright.——"Whittaker's Almanack for 1869. Office, 12, Warwick-lane, Paternoster-row." This is an excellent almanac of nearly 400 pages, containing, besides the almanac proper, with the usual astronomical and other phenomena, also a large amount of information respecting the government, finances, population, commerce, and general statistics of the British Empire throughout the world, with some notice of other countries, &c.——"Notes on the Geology of Powys Land. By W. Boyd Dawkins, M.A., F.R.S., &c. No. 1." This is the first portion of a paper reprinted from the "Montgomeryshire Collections" issued by the Powys-land Club. It contains a popular account of the geological features of the vicinity of Welshpool.——"Golden Arrows" is the title of the Christmas number of the *Quiver*, and contains for sixpence a large amount of pleasant reading. The last of the stories, "Marion Lee's Good Work," by the author of the wonderfully popular "Trap to Catch a Sunbeam" (Mrs. Henry Mackarness), will commend itself to many of our readers. It tells in a charmingly simple manner how a little helpless peasant-girl built a church, and it inculcates the value of faith and perseverance. The events follow each other so naturally that the result seems quite probable. The story, like the rest of the book, is prettily illustrated.——The same author has added to her "Sunbeam Stories" (Lockwood & Co.) a pretty little tale, under the title "Married and Settled."——The title of "The Boy's Home Book" (Lockwood) sounds a little too much like an endeavour to confuse it with a well-known standard work of the same character. However, it is a smart little volume, pleasingly illustrated.

Miscellanea.

A Pre-Historic Pompeii.—Under this title the *Revue des Deux Mondes* publishes an article by M. F. Fouque on some underground villages discovered in the small Island of Therasia, adjoining Santorin, of volcanic notoriety, in the Greek Archipelago. The writer affirms that we have here a distinct proof, not only that the human race may be traced in the quarternary period, but that even then it had made some advance in civilisation. It appears that these primitive villages were destroyed by volcanic agency. The houses were built in the open air, on the old soil, and were afterwards buried under a stratum of pumice-stone and tufa, ejected from a crater. The inhabitants were taken by surprise in the midst of their daily vocations, and their tools, vases, and domestic utensils have remained for thousands of years on the spot they occupied at the time. At Santorin and Therasia the strata of tufaceous pumice have been worked from time immemorial as building material, and a good deal of it has been exported to the Suez Canal. But the habitations consist of large blocks of lava, heaped one upon another without any order, the interstices being filled, not with any kind of mortar or cement, but with reddish volcanic ashes, having no cohesion whatever. The only house hitherto entirely exhumed is composed of six rooms, the largest of which is 18 ft. by 5 ft., and the smallest about 8 ft. square. One of the main walls of the building encloses a court. Three windows and one door have been recognised. The ceiling was composed of a series of wooden cross-beams, on which stones and a thick layer of volcanic earth were spread. Among the objects found inside there was the skeleton of a man, besides flint implements, earthen vases manufactured on a turning-wheel, and containing various seeds, such as barley, peas, cardamom, &c. The most curious relics were certain stone disks with a hole through the middle, and which are still used in the country by weavers to stretch the threads of the warp with.

Fall of a Bridge on the Rhine: Forty Lives Lost.—The *Rhine Gazette* says:—"The iron bridge, yet unfinished, which the Railway Company of Berg was having constructed across the Rhine, has fallen, in consequence of a laden vessel having come into collision with the scaffolding of the construction. About forty workmen have been killed and twenty wounded in the catastrophe. This accident will retard for six months the completion of the bridge."

Pantomime Architecture.—Very seasonable, indeed, are the revelations made by a select committee of the House of Commons on the sources of authority in matters of public architecture in the great metropolis. The report of this committee is full of hints for the scene-painter; and perhaps those adventurous artistes might easily obtain a loan of the photographs that were submitted to the committee, to furnish hints for comic scenes in the coming Christmas festivities. One of these, produced by Mr. Cole, showed the railway-bridge across Ludgate-hill, with a breadth of wall advertisements, and Alderman Waithman's monument, the bridge blotting St. Paul's Cathedral out of the view, "a sort of thing for a pantomime." London abounds with architectural anomalies and absurdities of the same sort, and we did not need a Parliamentary committee to remind us of them. But the committee has done good service nevertheless, for it has placed solemnly on record, in the most emphatic manner possible, the too well-established fact that in matters architectural London is as much without a government as it is in matters political and social. Although such trite examples are set before us in the report, it is impossible to be angry. It is like a mirror in which, while looking at ourselves, the conviction is quietly forced upon us that we are supremely stupid.—*City Press.*

New Mode of Setting Boilers.—Several boilers in Sheffield have been set upon a new plan. By a simple arrangement of fire-clay plates, says the *Sheffield Independent*, so managed as not to contract the capacity of the flue at any single point, the gases, after being thoroughly intermixed, are at four successive stages in their progress through the flue, thrown, in thin streams, against the surface of the boiler. No part of the gases can escape this repeated forcible contact with the boiler, and in the process the heat they contain is so thoroughly extracted and absorbed that the result obtained, as proved by careful tests, is the evaporation of nearly 12 lb. of water for every single pound of fuel, common boiler slack being used. This gives a large saving of fuel as compared with the best modes of setting previously in use. The patentees, we understand, guarantee a saving of 25 per cent. The apparatus has the additional advantage of being an effective smoke-consumer. The plan is applicable to any class of boiler; can be applied without unseating boilers already fixed; and the plates being of fire-clay, the cost is so moderate as to be very soon recouped by the saving of fuel.

The Proposed Public Hall for Newcastle-under-Lyme.—A meeting has been held in the town-hall, to further consider the desirability of erecting a public hall in the town. The need for a building with a large hall, rooms for building and friendly society meetings, and for the accommodation of the volunteers, was generally admitted; and it was thought no difficulty would be found in raising the required capital to carry out the project. The only difficulty experienced was as to securing a suitable site. The Rectory Field, situated in the centre of the town, was thought to be the most eligible spot on which to erect the hall. An area of 1,200 ft., it was thought, would be sufficient, and a building to meet all the requirements of the town could be erected for 3,500*l*. On behalf of the Temperance Society of the town, it was said that if they could get the accommodation they needed, they would abandon their own idea of erecting a temperance-hall, and fall in with the present scheme. The meeting resulted in the appointment of a committee, and a deputation to wait upon the Rector of Newcastle, to see upon what terms the land mentioned could be obtained.

Channel Railway Bridge.—M. Boutel's proposed bridge across the Channel is obtaining attention. Lord Henry Lennox, in his address at the Society of Arts, said, "My impression is, that this is the best scheme for a bridge over the Channel that has been proposed. There is in Paris a model, on a large scale, which bore ten times the weight which would require to be borne by the Channel Bridge, constructed with less than one ton of metal, and resting on two abutments of rough timber, which were incapable of sustaining a very great strain. M. Boutel was kind enough to describe his drawings to me at length; and even if the Channel Bridge were not attempted, his plan of building in bridges is capable of such astonishing results, as to make it well worthy the study of our own engineers."

New Lighthouse Apparatus.—In the Lochindaal Lighthouse, in the island of Islay, Argyleshire, Messrs. Stevenson, the engineers to the Northern Lighthouses, have introduced dioptric prisms of a new form. They are described in the "Transactions of the Royal Scottish Society of Arts," by Professor Swan and Mr. Thomas Stevenson. The light which passes behind the flame has hitherto been sent forward by two optical agents, so as to mingle with the front light, and thus to reach the eye of the mariner; but the object is now effected for part of the upper core of rays by means of the new prisms alone, so that one agent is saved, and the loss of light by absorption and superficial reflection is prevented. The prisms act by refraction and total reflection, and they consist of glass of the ordinary index of refraction. By means of these prisms and a spherical mirror, the whole of the back light is sent forward. They can be modified in various ways to suit the requirements of different localities.

The New Workhouse, Hertford.—At a recent meeting of the Hertford Board of Guardians, a letter was read from the Poor-law Board, which stated that the inspector had reported that the Hertford Workhouse was over-crowded, the number of inmates exceeding the prescribed maximum by 16; and asking why the guardians did not take possession of the new workhouse. The clerk was directed to reply that a dispute had arisen about the amount to be paid for building the new house, and that an architect was making an inquiry into the subject. A letter was read from Mr. Trollope, the architect engaged by the board to measure the work in the new building, in which he stated that the work had been delayed in consequence of his attendance being required at an arbitration, and that the measurements had occupied more time than he expected, but that he hoped to have his report ready within a fortnight. It was finally agreed to request Mr. Trollope to let the board have the report, if possible, forthwith.

Compensation Cases.—At the Guildhall, Westminster, before Sir W. Bodkin, justice of the peace for Middlesex, and a special jury, an important case was tried with reference to the liability of a parish to compensate an individual owner for compulsory removal. The claimant (Miss Birch) was a teacher of dancing, residing at No. 5, Hinde-street. She numbered amongst her pupils duchesses, countesses, viscountesses, both English and Irish; and even archbishops patronised her establishment! In order to carry out certain local improvements it was necessary to pull down her house in Hinde-street, which she held under a lease, dated the 16th of July, 1852, for twenty-one years, at a rent of 150*l*. per annum. The lady claimed from the vestry 4,000*l*. as compensation for her forced removal. After a number of witnesses had been examined, it was agreed to settle all claims by the payment of 1,550*l*. Mr. Hunt, a surgeon, who lived next door, and also claimed 4,000*l*., accepted 1,300*l*.

Carpeaux's Sculptures on the New Opera House, Paris.—It has been decided that M. Carpeaux's group of dancing-girls in front of the new opera is to be removed. The reason given for this resolution is because, quite apart from the question of their artistic merit *per se*, they are an eyesore in their present position, being out of proportion with the other sculptured ornaments of the façade of the edifice. A place will be found for them in one of the interior courts. But as M. Carpeaux is commissioned to execute another statue, or statues, to be placed on the spot where the objectionable group now stands, the change will probably not be made for the next two years.

Death of Mr. David Napier, Marine Engineer.—The Scotch papers contain the announcement of the death, on the 23rd ult., of Mr. David Napier, of Glenshellish, Argyleshire, at the age of 79. Along with his relative, Mr. Robert Napier, of Shandon, he laid the foundation of the world-wide fame of the firm of Napier & Sons as shipbuilders and marine engineers. As far back as 1818 he was the first to introduce British coasting steamers, as well as steam packets for our Post-office service. He was also first to establish a regular steam communication between Greenock and Belfast. Mr. Napier invented the steeple-engine, which was a great improvement on the side lever, as occupying much less space.

Housebuilding under Difficulties. — A contemporary states that a warehouseman at Bradford has built a house for himself at the top of Pasture-lane, Clayton, near Bradford, which is described as "an attractive structure." This enterprising individual, who is of frugal habits, a teetotaller, and blessed with a family, purchased a piece of land with his savings. He excavated the foundation of his intended house himself, and fetched the building-stones from a quarry 300 yards distant, the total number of barrowfuls required numbering 548. He pitch-faced the stones in his leisure hours, and the structure grew under his hands, until "Virginia Cottage," as he calls his mansion, stands an enduring monument of plodding perseverance. The style is said to be "Gothic," and there is one room on the ground floor, a kitchen in the rear, and a sleeping-room upstairs. The heads of two noble ancients — Demosthenes and Socrates—carved in stone, ornament the front of the cottage, and a carved representation of the head of little Eva, of "Uncle Tom's Cabin," is built into the homestead.

The Age of Iron.—In these islands alone 500 blast furnaces are blazing; reducing, by their intense heat, nearly 12,000,000 tons of iron ore to 4,800,000 tons of metallic iron, which, at its place of production, has a value of about 11,000,000*l.* sterling. Those blast furnaces consume more than 14,000,000 tons of coal; and, to convert the pig iron obtained into bars, rails, and the like, a like quantity of coal is required. The great iron industry is not confined to the British Isles alone. In France it is no less active, and it boasts of ironworks which rival those of Dowlais, of Barrow, or of Middlesbrough. The works of Messrs. Schneider & Co., at Le Creusot, the largest in France, have fifty acres under cover. Here are fifteen blast furnaces, with twenty-seven steam-engines blowing air for them, and forging iron besides. At the mines and works over 3,500 men are employed. Belgium, Prussia, Austria, and Sweden are active in this great race; and America is striving, with earnest and honourable zeal, to overtake Europe in the production of iron from her native ore, with her own coal.

Remarkable Discoveries on the Yorkshire Wolds.—Near Bridlington, the Rev. Canon Greenwell, of Durham, and his party, have made the most remarkable of their archæological discoveries, in the examination of two very large round tumuli, at Rudstone, where the only known megalithic monument in the East Riding is,—the famous example of the Celtic menhir, or long stone, in the churchyard. The barrows are in the immediate vicinity. They were full of secondary burials, in deep graves, dug in the chalk rock, in one case 11 ft. This contained a double kist of great stones of oolitic sandstone, which must have been transported 12 miles, from Filey Brigg. Some of these stones must weigh a ton or more. Fine specimens of pottery and stone implements were found, with the human remains. Drinking-cups with ornamental patterns, in zigzag, or waving and chevron lines, &c., one of them still containing some substance in it, were found, together with a bronze awl.

Parish Rating.—At the annual dinner of the Brompton and Little Chelsea Benevolent Society, Mr. William Corbett (of the firm Corbett & M'Clymont) presiding, the vice-chairman, at the close of the evening, proposed the health of the chairman in eulogistic terms, and alluded to the benefits he and his partner had conferred upon the parish by their building operations. Mr. Corbett, in reply, said—About eight years ago he commenced to build in the neighbourhood, and had erected upwards of 800 houses, nearly 500 of which were occupied, the remainder being unfinished. Notwithstanding the large number of houses that were occupied, it was a fact that the rates increased. He should much like to know how this was. He had another 250 houses to build, but if rates went on increasing so, he thought he had better leave building alone.

Committee of Mechanics.—The Council of the Society of Arts have determined to appoint a committee to take into consideration and discuss all matters of mechanical invention which may come before the society, and which may be of too strictly a technical character to interest the members at large at the Wednesday evening meetings. The action of the committee will resemble, to a great extent, the mechanical section of the British Association.

Memorial of the late Rev. Dr. Todd.—The services rendered by the late Rev. James Henthorn Todd to the elucidation of ancient Irish literature are admitted by all Celtic scholars at home and abroad. These services claim a distinguished recognition from the people of Ireland, and from all those who appreciate the high and enduring agencies for social advancement which spring from the cultivation of a sound national literature. At a public meeting held at the Molesworth Hall, Dublin, it was decided that the most suitable memorial would be to endow a Professorship of the Celtic languages, the study of which is becoming every day of increasing importance at home and abroad. Efforts are now being made to raise funds for this purpose. The Society of Antiquaries are co-operating. Sir William Tite and Mr. Chappell have been named to represent them on the committee.

The Repavement of London Bridge. — This work is now completed. The mode of paving is much the same as previously, viz., a new tramway, 12 in. in width, next the kerb, to take the near wheels of the vehicular traffic, the old tram being redressed and relaid to carry the off wheels. The whole of the remaining space is paved with new 3 in. by 9 in. Aberdeen granite cubes, with Guernsey guard stones. The length of the carriage-way is upwards of 1,000 ft.; its width 35 ft. There are about 3,500 courses of stone in its entire length, and the number of stones necessary for the roadway (including the trams) is about 105,000. The total number of tons (inclusive of stone, sand, lime, water, &c.) is between 3,000 and 4,000. The stipulated time for the completion of the work was twelve days. The contractors, Messrs. Mowlem, Burt, & Co., have had on this work about 400 skilled workmen.

Gift of Almshouses to Meltham, near Huddersfield.—Mrs. Hirst, wife of Mr. Joseph Hirst, J.P., Wilshaw, near Huddersfield, and Cheshire, has intimated her intention to build and endow six almshouses on a portion of a plantation near Wilshaw Church. Mr. Hirst, at his sole cost, has erected two churches (Wilshaw and Thornton) and schools, and also contributed largely to various charities. The houses are to be built from designs by Messrs. Kirk & Sons, architects, Huddersfield, in three couples, and each dwelling to have connected with it living-room, scullery, larder, and two bedrooms, and conveniences adapted to the requirements of aged or infirm people. The houses will be situated a mile and a half from the Convalescent Home, which Mr. Charles Brook, of Meltham, is building and endowing at a cost of 30,000*l.*

Pulpit, Sutton Courtney.—An elaborate stone pulpit has just been erected in this church, and was first used on November 21st. It has a square base, with semi-columns and carved capitals, over which is a circular platform; the part above is formed by the half of an octagon, panelled and arched, having carved capitals. The four panels will have, on a gold ground, painted figures of the Four Evangelists: these are nearly finished, and will shortly be added to the pulpit, which has been designed by Mr. Wm. Gibbs, architect, who was also the architect for the recently restored and enlarged vicarage-house in this village. Mr. C. Selby, of Oxford, erected the pulpit.

Excavating by Machinery.—A machine for the excavation of the earth and for throwing it into trucks or otherwise disposing of it, has been exhibited in operation on the grounds of the Ashburnham estate, next to Cremorne, Chelsea. The inventors consider it likely to effect a revolution in railway and canal work as at present done, as it cuts away, removes, and throws into wagons or upon the bank as required, about 60 centimètres, by 2·50 high, and 2·95 wide, or 2,655 cubic mètres per diem, at the cost of a few shillings.

Beds Archæological and Architectural Society.—The annual meeting of this society has been held in the library of the Literary and Scientific Institute, Bedford. The chair was taken by Mr. A. E. Birch, mayor of Bedford, who is *ex officio* a vice-president. After the election of office-bearers, the Rev. J. W. Haddock read the report, which was adopted. Various objects of interest were then exhibited, and a vote of thanks to Mrs. Mendham, for valuable cases of coins, was passed by acclamation. A paper on Bedfordshire in the Danish period was then read by Mr. C. E. Prior, of Bedford, M.D.

Preposterous Tenders. — The following tenders have been received for roads and sewers at Brixton Manor estate. Mr. C. Sewell, architect:—

	Roads.	Sewers.	Total.
Wigmore	£2,499	£1,740	£4,239
Waterfield	1,940	1,801	3,741
Turner & Cole	1,648	1,906	3,553
Mayo	1,565	1,781	3,346
Hardman	1,576	1,593	3,169
Young	1,559	1,315	2,865
Coker, in one sum for the whole			2,342
Porter ,, ,,			1,050

Similar discrepancy has been lately observable in other tenders for roads and sewers, but probably never greater than in these. Such incidents bring scandal on the trade.

The threatened New Prison.—The Middlesex Magistrates, at their last meeting, decided against the proposed and half-sanctioned scheme of rebuilding the county prison. A wiser and more timely decision was never come to by an irresponsible body. The scheme was viewed as both superfluous and untimely. The magistrates have done wisely in listening to the emphatic protests of the ratepayers against it. The amendment passed declares that our whole system of criminal treatment needs revision, and "is a great and needless burden on the honest inhabitants of the country."

Crystal Palace.—Since the erection of the new stage and theatre, Operas in English have been played with great success two or three days in each week. Large as the theatre is, it has been constantly crowded. The necessary rehearsals and preparations for the Christmas Pantomime, which is always produced at the Crystal Palace a few days before Boxing Day, necessitates the termination of the English Opera performances after next week,—up to which time they will be continued, in order that visitors to London for the Cattle Show may witness one or more representations.

Lighthouse, Ceylon. — Messrs. Shearer, Smith, & Co., of the Dalbeattie Granite Quarries, N.B., have obtained from the Trinity House Corporation the contract for the supply of dressed granite for the Great Basses Rock Lighthouse, Ceylon.

Discovery of a Roman Altar at Eastgate, Stanhope-in-Weardale. — A Roman altar has been discovered in a wood near the little village of Eastgate. The stone belongs to the millstone grit strata, and is finely wrought. It is 4 ft. in height, 22 ft. in breadth, and 12 ft. in depth. It bears the following inscription:—

"DEO
SILVANO
AVRELIVS
GVIBINVS
PRÆF."

Which signifies that the altar had been dedicated to the deity Silvanus, the heathen god of the woods, or country, by Aurelius, Præfect of the 1st Cohort of the "Gordian Legion." This was in the reign of Gordianus (the third of that name). M. Antonius Gordianus Pius reigned A.D. 238-244.

TENDERS.

For rebuilding the White Horse, Pond-street, Hampstead. Mr. F. Mew, architect:—

Maidlow	£1,400	0	0
Watson	1,291	0	0
Till	1,121	0	0
Bean	1,095	0	0
Kelly	1,092	0	0
Haley	1,057	0	0
Cook	1,050	0	0
Watts	996	0	0

For the erection of a pair of model cottages, fitted with Moule's earth-closets, &c., at Wilton, Taunton, for Mr. Henry Badcock. Mr. Houghton Spencer, architect:—

Rendell	£441	14	6
Davis	430	0	0
Pollard	388	0	0

For country residence, stabling, lodge, &c., near Rhayader, Radnorshire. Mr. E. H. Lingen Barker, architect:—

Washington & Co.	£3,456	0	0
Morgan & Potter	3,407	0	0
Yates	3,279	0	0
Wood & Sons	3,236	0	0
Moreland	3,213	0	0
Birrell	3,124	0	0
Jones	3,117	0	0
Evans	3,116	0	0
Lewis	3,094	0	0
Morgan	2,771	0	0
Williams & Bolton	2,764	0	0
Harrison	2,754	0	0

For first portion of draining and fencing works to the St. James's Building Estate, Hereford. Mr. E. H. Lingen Barker, architect :—

Clifford	£385	0	0
Freeman	359	0	0
Evans	295	0	0

The tender of Messrs. Crabb & Vaughan, by schedule of prices, has been accepted, for building three warehouses on the Charterhouse Estate, Goswell-street.

TO CORRESPONDENTS.

R. S.—H. A. G.—A. R.—Mr. A.—H. S.—J. W.—W. C. T.—A. K.—C. W. F. G.—Opera-goer.—J. N.—Landowner.—L.—J. W. T. & Co.—Mikros.—C. L. G.—R. R.—H.—G. F. B.—R. B. G.—J. M.—J. G.—J. H.—F. D.—C. C. H.—J. V.—H. H. V.—F. B. & Co.—T. P.—J. & S.—A. B.—J. M.—J. K.—T. B.—G. W. C.—W. J. S.—R. K.—R. L. T.—W. W.—S. S.—E. H. L. R.—J. F.—J. P.—R. P.—T. D.—Trustee.—C. B.—M. P.—J. U.—J. D.—C. L. (*Architectes Oblibres* received).—W. H. B. (a flue divided into compartments would have up and down draughts. An arrangement for condensing smoke by spray of water has been patented).—Y. (next week).—Effort for Architects' Assistants (next week).

Various communications in type are necessarily postponed.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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RICHARD H. BUSH, District Clerk, Bideford.

TIMBER TRADE, English or Foreign.—WANTED, a RE-ENGAGEMENT, as SALESMAN, YARD FOREMAN, BUYER, &c. Three years in last situation. Aged 27. Town or country.—Address, WILLIAMS, 90, Windsor-road, Holloway, N.

TO CIVIL ENGINEERS, SURVEYORS, AND OTHERS.

SURVEYOR, &c.—WANTED, an ENGAGEMENT as SURVEYOR, ENGINEER, or DRAUGHTSMAN. Practically acquainted with sewer construction, water-supply, town improvements, &c. and is fully competent to undertake the execution and entire charge of same. Sixteen years' practice.—Address, C. K. Post-office, Bradford-on-Avon.

HOT-WATER WORK.—EMPLOYMENT WANTED, by a thoroughly practical FITTER, of any description. Piecework or daywork, large or small job, with tools or without. Has a son for mate if required. Terms moderate.—Address, Z. 20, Charles-street, Hatton-garden, London.

EVENING EMPLOYMENT is solicited by a Builder's Clerk, either at home or elsewhere. Disengaged after Seven, and at Four on Saturdays. Terms moderate.—Address, A. B. 5, Brecon-terrace, Maxwell-road, Fulham, S.W.

TO BUILDERS AND SURVEYORS.

BUILDER'S CLERK.—WANTED, by a Gentleman, now leaving a Building Firm (where he has been two years), a SITUATION as ESTIMATER, MEASURER, &c. He is a good Builder's accountant, and well understands office routine.—Address, SURVEYOR, care of Mr. Russell, 13, Bartholomew-road, Kentish-town.

A GENTLEMAN, aged 35, a competent ACCOUNTANT and able to undertake the Management of an Office, having been upwards of seven years chief clerk in the employ of a large public company, seeks a similar ENGAGEMENT, or in any position of trust and confidence. References to the Directors of the Company and other gentlemen.—Apply, H. care of H. Fielding & Son, Plated Spoon and Fork Manufacturers, Snape-street, Wolverhampton.

AN ARCHITECT, a first-class Perspective Draughtsman and Designer, and used to the complete Management of an Office, OFFERS his SERVICES temporarily.—Apply to M. N. care of Housekeeper, 22, Buckingham-street, Strand.

TO LEAD, OIL, AND COLOUR MERCHANTS.

A GENERAL FOREMAN, for many years engaged in this capacity, is desirous of obtaining a similar SITUATION or any other where trustworthiness is required. Can refer to last employers.—Address, W. L. 101, High-street, Wapping.

TO ARCHITECTS, &c.

A GOOD GENERAL ASSISTANT and DRAUGHTSMAN WANTS a SITUATION in London. Well up in construction, design, detail, perspective, quantities, measuring up work, surveying, and levelling. Is used to management of an office, preparing specifications, and inspecting works. Good references. Salary very low.—Address, ALPHA, 6, Friar's-walk, Exeter.

TO BRICK, TILE, AND DRAIN PIPE MAKERS.

A RE-ENGAGEMENT is WANTED, to MAKE BRICKS by CONTRACT—small or large contracts—in close or Scotch kiln, or stock work. Twenty years' experience; last nine years by contract. Good reference.—Address, J. B. at Mr. J. Hayward's, Stationer, East Grinstead.

A BUILDER'S ASSISTANT is open to an ENGAGEMENT as CLERK, in either town or country. Has filled a similar position with a London firm for the last six years, and can give first-class references and testimonials. Salary 35s. per week.—Address, H. H. 4, Chesterford-terrace, Stanley-road, Hackney.

TO ARCHITECTS, &c.

A GENTLEMAN of experience is open to an OFFER of PARTNERSHIP in a respectable Firm in either of the southern counties. Near the coast preferred.—Address, B. B. care of Messrs. Stone & Hartley, Booksellers, Banbury, Oxon.

TO BUILDERS, ENGINEERS, OR ARCHITECTS.

A YOUNG MAN, capable of making neat tracings, drawings, and writings, DESIRES an ENGAGEMENT at a moderate salary. Town or country.—Address, J. H. B. 7, Pullin's-row, Upper-street, Islington, London, N.

ARTICLED PUPIL WANTED, by an Architect holding a public appointment in the City. Moderate premium required.—Address, R. A. Post-office, Cannon-street.

TO CARPENTERS, MASTERS, AND FOREMEN.

A YOUNG MAN, who has served his time, and since worked journeyman, wishes to IMPROVE himself in a good shop for a year or two at low wages.—Address, JOINER, 54, Princes-street, Leicester-square, W.C.

TO BUILDERS, ARCHITECTS, AND PLUMBERS.

A YOUNG MAN, a good PLUMBER, wishes to meet with a JOB, in Town or country. Can turn his hand to gas or zinc work, if required, or fulfil the requirements of a Builder's firm. Undeniable reference can be given to last employers.—Address to W. W. 24, Blandford-street, Baker-street, Portman-square.

A PLUMBER is in WANT of a JOB or constant place. No objection to fill up his time in the other branches.—Address, S. W. Post-office, Harrow-road, W.